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THEIR LIVES, LOVES AND TRAGEDIES

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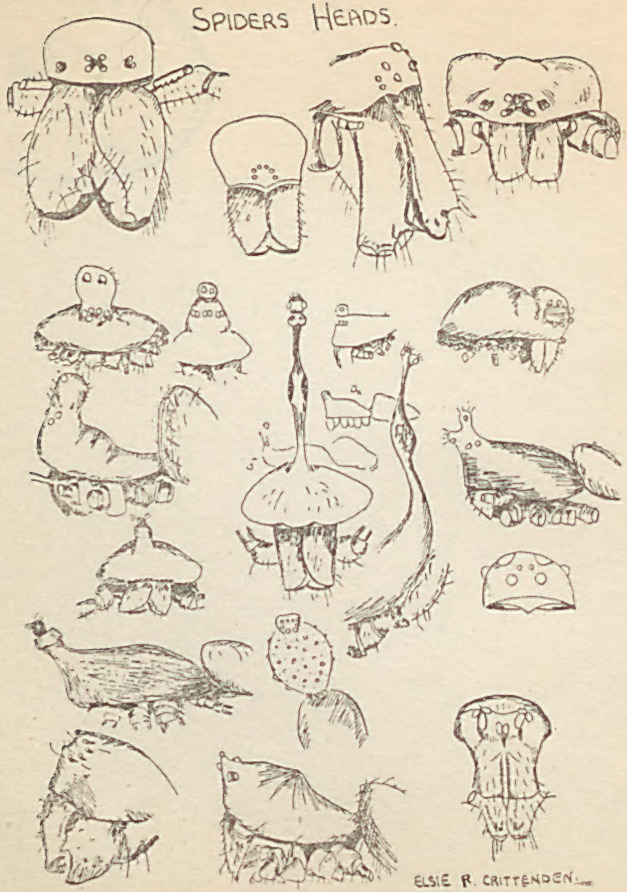

Elsie R. Crittenden.

British Spiders: Their Lives, Loves, and Tragedies

By

Edward C. Ash, M.R.A.C., F.R.M.S.

Author of "Pond Life,"
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Illustrated with over 140 Text Drawings by F. F. Hearn, M. D. Cooper, E. R. Crittenden and the Author, and a Coloured Cover Design by E. Harrington

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BRITISH SPIDERS

INTRODUCTION

We will venture into the world of spiders and see these curious and interesting little people living their lives; a calm, happy, brave people too, who appear in multitudes in some seasons of the year and make the air full of their silk. Then a few weeks later, when it has turned cold and winter has set in, the multitudes are gone, and you may have to search for quite a long time to find even a single specimen.

You have only to catch a glimpse into Spiderland to be fascinated, fascinated so much indeed that you will wish to learn all that is known of these small intelligentia. You will soon find that spiders have been misunderstood, their habits grossly exaggerated and misinterpreted. They have, in consequence, served as a symbol for evil, so that we, like many others, may be deeply prejudiced against these creatures and feel that spiders are most unpleasant, which is far from true.

The spiders' crime, if we can term it a crime, is that they are carnivorous, like ourselves, living on flesh.

As we read we will find our ideas altering, and we will see that, as a variety of life, spiders are more than usually intelligent, and their habits and love affairs are so fresh, so new, so real, that their study becomes one of the most fascinating things on earth.

They are a small people who live hard lives, and love whilst they love intensely. Some dance madly to express their feelings, and although even after all that some of their love affairs may have tragic endings, others are just as happy in their final scenes. All spiders do not eat their husbands, but some do.

As a people, spiders live surrounded by such vast dangers from egg to old age, that the wonder is that spiders have not long ago joined the extinct animals of this world. The wonder is that they exist at all. Enormous numbers of eggs are attacked by those dreaded horribly savage insects, the ichneumon-flies, which neatly deposit their eggs inside the spiders' eggs, the finish to many a young embryo spider. For the ichneumons hatch first, and the fly larva then feeds hungrily on the spider embryo put there, as far as the ichneumon fly must suppose, for that very purpose. When the spider's egg hatches, out comes an ichneumon fly.

Birds destroy spiders, for most birds, insect

eaters or otherwise, consider spiders the most tasty morsels, and the insect-eating birds are particularly partial, and will search every hole or crevice in a wall, and patiently scratch the fallen leaves over and over again to uncover some unfortunate spider, which, no sooner discovered, is swallowed with relish. And perhaps worse still for the spider world, birds are only too fond of removing entire cocoons containing the eggs for the purpose of making parts of their nests, for what could be better than spider silk? In this way enormous numbers of eggs are wasted during the early and middle summer.

Again, those spiders which live or rest underground suffer severely when sudden heavy rains occur, and this, no doubt, partly accounts for the fact that Atypus is so scarce.

And to make matters worse for Spiderland their "civilization" is a short-sighted one. They do not realize that whilst they prey on others, others prey on them. For there is endless warfare, a vendetta without end, which eliminates enormous numbers. It is curious war this, for whilst the babies in the nest are the best of friends, yet no sooner do these young spiders start web keeping on their own than frequently a never ending guerilla warfare is undertaken. Brother kills brother, sister kills sister, brothers and sisters meet in last embraces, and mamma eats a few to help in the work of elimination. Without any compunction the

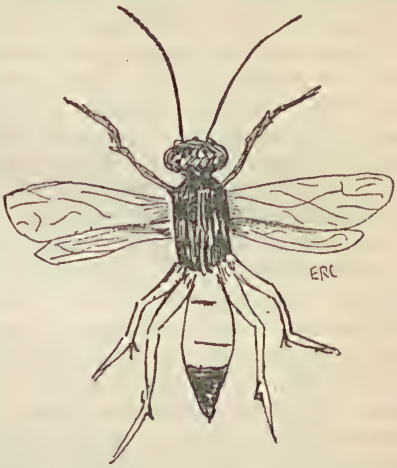
owner of one web seizes and kills the owner of the next and eats her.

So it goes on day by day, ending in so many webs without owners, and here and there just one web in which reside the resultants of the greater part of many a numerous, prosperous and happy brood. These slaughters are the greatest fun, of course, where the spiders concerned belong to a variety which remains close to hatching sites, and little wonder perhaps that many of the baby spiders make it a rule to set sail for other places as soon as they are large enough to do so.

This flying away prevents cannibal relations' prompt attentions and thus saves many a young life; but good as this may seem, it all the same causes a large number of casualties. Some of the "airmen" are blown further than they meant to go, some sail over the sea, and if the wind changes or becomes wild and gusty, many are beaten to death against obstacles on the earth below, or fall into the angry waves. Frequently ships at sea are all at once covered by millions of spiders which fall on to the decks, and all around hosts of spiders pour down into the waters, a sad end to a great adventure.

Whilst the mortality amongst spiders is serious in all seasons, yet during a season when insect life is scarce—a season with a cold summer has killed the embryo in the eggs, thus few flies, gnats, midges—the murder instinct amongst

the spiders becomes an obsession. Unable to find insects, the hunting spiders, who are usually careful to give each other a wide berth, now set out to kill others of the same species. They wander about everywhere, hunting down spiders of all kinds, fighting to the death anything living which may happen to cross their paths, and be suitable, in the spider's sense, for food.



How glad I am that I am not a spider, you may say when you consider all this and the many dangers still to come. For spiders are meat for many mouths. The Fossorial wasps love them and quickly jerk the unfortunate spider out of its home. A leg is seized, and pulled with a jerk, and then, as the wasp leaves go, the spider falls, and before it has time to recover the wasp is on, bends its abdomen and stabs. The assassin is no mean expert, for in that moment the wasp has struck in such a manner and in such a

place that the spider does not die, but is paralysed and lies there as if dead. The wasp seizes its victim, and carries it off, a crumpled-up thing, and arriving home, bundles it into a hole where it will lie alive, and yet unable to move, while the embryo wasp in the egg gradually changes until the time comes when the egg will hatch into an ever hungry grub.

There are also some other ichneumon flies which prey on adult spiders. They swoop down towards the web; the unfortunate creature sees it coming and hurriedly drops out and hangs on the end of a line below its home. The ichneumon fly expected this, for it flies down and settles on the line on which the spider hangs. There the unfortunate spider swings to and fro, too terrified to try and escape or even defend itself. The ichneumon fly is crawling slowly, very slowly down that line towards its victim and then reaching it, just as quietly turns and lays an egg on the spider's back at the place where the cephalothorax and abdomen meet, a spot which no spider can reach with its legs. The object of the visit is accomplished, and the ichneumon spreads her wings and flies away.

The spider, no worse for the experience, crawls up her line back to the web and lives there as usual. But the ichneumon egg a few days later hatches into a curiously vicious and blood-hungry larva, and seated there at a spot safe from interference, just feeds and feeds further and further into that spider's body. At last it has eaten

its way down into vulnerable parts, and the unfortunate tormented thing dies from exhaustion.

After this you may well say that you are glad that you are not a spider, and may realize that serious as they may be to the insect world, their lives are by no means quite so safe and happy as one might suppose.

Amongst British spiders we find none of the extraordinary shapes so frequent amongst those of America and of the tropics, nor do we get the wonderful colouring so constantly to be met with there. Yet many of our spiders are beautiful. Some have vivid colours.

Spiders lived on this earth long before man made his appearance, for in the great coal age, the age of insects, spiders were also existing in considerable numbers. In the most ancient of the carboniferous rock two hundred and fifty different varieties of fossil spiders have been discovered. Most of these are in appearance very similar to the spiders of these islands to-day, but a few are weirdly

shaped, and resemble some of the rarer and curious varieties to be met with in the tropics.

In Spider science in 1801, Blackwall's "British Spiders" was published, a superb book dealing with three hundred and four varieties divided into eleven families. Thorell follows with his book, and subsequently the Rev. Octavius Pickard-Cambridge in 1879 brought out his classic and excellent books "The Spiders of Dorset."

About 1889 McCook's "American Spiders" appeared, a set of three large volumes dealing with the life history and habits of the spider world.

It is a noticeable fact that spiders, as a group, are, except for the mites and ticks, far more numerous than the other Arachnida, the scorpions, harvestmen, etc., and their numbers and probably the fact that they have survived is largely due to their high order of intelligence, and because by means of their spinning powers they can overcome difficulties which those who must perforce travel entirely on their feet are less able to do.

Spiders appear all over the world. Many species are cosmopolitan, and, except in the very cold parts of the North and South areas, and on the highest mountains where insect life is absent, they hold their own.

For applied intelligence in "lower" animals, the spider world gives many examples. The trap doors of the trap-door spider of Central Europe and other parts of the world outside the British

Isles is just an example. Here you get a door so made that it closes by gravitation, the edge being specially weighted to close that door automatically when the spider goes in or out. Apart from this example, there are numerous highly complex arrangements used in Spiderland, all of which show that, small as a spider is, it has certainly more than mere instinct at its command.

We must remember, however, that the word "instinct" is the safety valve of the blind and ignorant, who fondly imagine themselves to be entirely apart from the animal kingdom. As ignorance dissipates, the word "instinct" will be used in a sounder and more adequate manner.

The use of spiders' silk for textile purposes has been attempted on several occasions; as a commercial proposition the outlook was never promising. 27,648 spiders were needed to produce a pound of silk —a somewhat difficult proposition, as each must have a separate home, or else the reduction in numbers means the end of the experiment.

M. Reaumur in 1710 made certainly a valiant attempt to commercialize the spider. He placed several tiny spiders in lots of fifty, and two hundred spiders in each cell, much to the delight of the few who, at the finish, remained swollen up with pride and relatives. A Frenchman, a M. Bon, made stockings and gloves, and a Spaniard also carried out similar experiments.

And to add to the trouble, apart from the housing

question, bad as this is, spiders do not willingly spin in captivity. To make matters still worse, egg cocoon silk is the only silk of much value. Though this silk is said to be equal to the very best in silkworm products, a spider silk farm is not an investor's proposition. Spider silk was at one time used in the micrometers of optical instruments because of its fine texture.

Spinneret, showing the three glands which secrete the silk.

History and Superstition

In spider history superstition and legend have both played a great part in the years now gone by. Ovid tells us how Arachne, boasting of her superiority in the art of the distaff to the Goddess Pallas Minerva, was changed by that incensed lady into a spider, hence the name of this group—Arachnida, spiders, scorpions and mites.

Dr. James in 1743, in his Medical Dictionary, tells a story of how a woman had a cruel habit of destroying spiders by burning them in the flame of a candle, and how at last, one of her victims dying, burst to flames cursing the tormentor, who thereupon suffered from somewhat awe-inspiring maladies, only relieved by eating spiders' webs.

We also read in other works of various miraculous

cures, a spider swallowed, a spider crushed and rubbed over a sore, a spider carried in a pocket or hung round the neck of a sufferer gave astonishing results. Spiders' webs were also the cure for many a disease. Spiders' web, however, has been used to stop bleeding, forming, as it does, an entanglement on which the blood coagulates. This was more a custom at a time when hygiene was less thought of and understood.

Spider weather glasses were at one time believed in, one of those truths which bears no dispute at the moment, but in time wears thin. So, of course, did the spider weather glass.

The gullibility of the ignorant and would-be startled has made the bite of a spider a source of much gain to those whose living depends on bluff —thus the Tarantula dance to be seen in Italy. No sooner, if sufficient were paid, was a man or woman bitten by one of these wolf spiders, than commenced a series of contortions and wild dances intermixed with much trembling—all the result, of course, of the bite of this spider. It was a very serious business indeed, quite worth the silver and copper thrown to the victim. Tarantula dances have been very profitable in their time, but to-day, as no one believes quite so easily, the dancers find other means to add to their living.

Pliny tells us how a spider will destroy a snake by piercing its brain. Scaliger asserts that spiders existed so virulent that if trodden upon, the poison

would pass through the soles of shoes, which indeed says much for the spider and precious little for the shoe leather.

It is strange how people in their right senses could believe such stories, for, considering the size of the spider, how it was to contain sufficient poison, even if no integuments were needed, seems to have passed attention.

Spiders are said to have a keen love for music, and whilst they are certainly sensitive to vibration, relying on sense of vibration for living purposes, whether they prefer Tchkovsky's "Sympathie Pathetique" to Jazz music is difficult to say. Probably Jazz, because of the intense violence displayed.

In Spiderland the ladies seem to predominate. The unfortunate males are far smaller, sometimes so small as to be quite insignificant when compared with their wives; also they are not so often met with.

This latter fact is not, however, because they have all been eaten or because they are actually rarer, but because most of the males are wanderers, and hence are not so often noticed, and then many a male is supposed to be a baby spider, unless examination shows that it is an adult of the sterner sex.

In the breeding season several males will be found visiting each lady, sitting on the very outside edge of her web, wondering whether to advance their troth, or leave whilst opportunity allows;

and some have small webs of their own, semi-detached residences where they reside at these times.

When the breeding season is over, the males which have escaped their love adventures, some minus legs, some with pieces torn from their bodies, and many with wounds, spend their lives homeless more or less, or make a small web, a very poor copy of that made by their womankind. Adult male spiders are certainly no use with the distaff.

But male spiders, which appear in large numbers in the breeding season, even if they escape death at the jaws of the females, subsequently die natural deaths, perhaps from disappointment. So after the breeding season is over the adult males are certainly in the minority.

The Poison Fangs

These are further described in the note on the anatomy of a spider. Stories of poisoning have resulted in the power of these fangs as poisoning weapons being grossly exaggerated. A spider bite is by no means a serious matter, even the most poisonous varieties will only cause a very slight irritation, and a similar irritation to the most poisonous spider bite can be obtained by application of a nettle.

Spiders, when capturing prey, only use poison in cases of strict emergency when other less drastic

methods of control have failed. The falces without the poison are a sufficiently drastic weapon, and cause serious injuries in the tender bodies of the victims.

The quantity and power of the poison depends, not only on the species, but largely on the temper of the individual. The more angry or excited, the more poison produced.

When an insect is poisoned by a spider, the insect is paralysed, the poison works off, the insect recovers. Spiders are conscious of this fact, and hence, even after using their poison, tie their victims most securely so as to prevent any chance of escape when they recover.

With all its eyes, what can a spider see? The experiments carried out by the Peckhams and those carried out by the writer give certain conclusions: firstly that the eyesight depends largely on the species, hunting and jumping spiders having far better eyesight than the web builders; also that, as one might expect, moving objects are noticed at a greater distance than stationary objects. Whilst jumping spiders will see a gnat at a distance of seven or eight inches, some spiders will miss a gnat at four inches!

Web-building spiders are nearly blind, and their eyes have a misty grey colour. You can test their eyes for yourself by placing the end, the pretty end of a lady's hatpin in a web, say of the garden spider and note the result. The spider feels the

vibration, hurries along to see the cause, stops when a few inches away and stares at the object, and, even then not quite certain as to its identity, moves nearer and stops to look again.

Follow a spider running along the earth, notice with what difficulty the creature makes up its mind what to do. If it is a wolf spider it seldom hesitates ; if it is a web builder it hesitates constantly.

Expression

Spiders show their feelings, and you have only to witness the lady starting out with the intention of eating her husband to view a depth of malice and hatred hardly conceivable. To see the same lady attacking a fly is an entirely different picture.

In the case of the husband she is full of loathing, pure and simple, as pure and simple as loathing can be ! When it comes to killing a fly, it is merely business, a business transaction.

Again, a male spider viewing a female is a very different creature to a male spider seeing one of his own sex. The expressions, in all cases exhibited by movements, carriage of body, etc., are too clear to allow any misinterpretation, and close study of these interesting creatures will show that love, hate, intense anger, anxiety and happiness all are recognizable.

How, with such a large world, with so many plants and so many species of spider, do the male

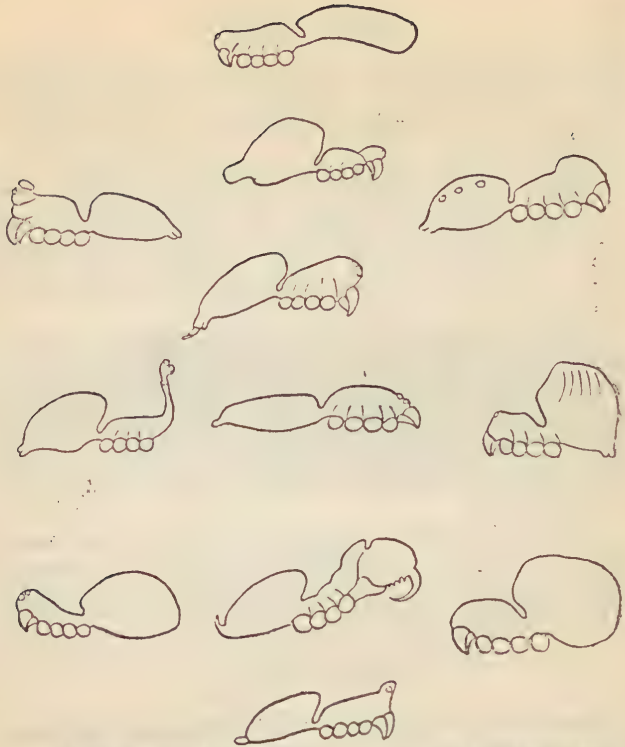
spiders find their wives? It is strange, but they do. They recognize the female of their own species by the size and colour, markings, etc. The size and absence of swollen ends to the palpi, give sex, but the colour and markings give the variety.

To learn the methods of recognition, the Peckhams placed a female in a compartment amongst males of her own variety. At once the males commenced to dance to her. She was then removed and painted blue, and placed when dry amongst the males. They certainly took an interest in her, no doubt realizing her sex, but they made no advances. They examined her, but, finding that she was not of their species, took no further interest.

On one occasion a male spider made half-hearted advances, perhaps recognizing in the female something which stirred happy memories. He danced sheepishly, half-heartedly.

Spiders see their mates at greater distances than they appear to see their prey. A female was seen by a male at a distance of twelve inches. As he saw her he showed every sign of intense excitement, and at once hurried towards her and plighted his troth. Whether he was eaten or not history does not relate.

Another question is, how do spiders communicate to each other? That spiders can "call" to each other, experiments seem to prove. It is said that they have certain organs for this purpose. Several spiders have on the underside of their abdomens



SHAPES SHOWING THE CEPHALOTHORAX AND ABDOMEN WITHOUT LEGS.

Walckenaera.

Walckenaera.
Pachygnatha.

Veleda.
Walckenaera.
Agelena.
Clubiona.
Atypus.
Walckenaera.

Eresus.

Theridium.
Epeira.

a round depression containing small hardened projections which is suggested to be the calling organ. Web-builders are usually very sensitive to sound.

Spiders, like cats, frequently play with their victims. After damaging the fly sufficiently to prevent any escape, they will allow it to wander off, only to be caught and carried back again, just as it felt free. In good time it is trussed up and eaten.

Again, spider wives often play similar naughty games with their lovers, who are also to be eaten in good time. They certainly allow the unfortunate lover minus some of its legs, or otherwise seriously injured, a sporting chance, and when escape appears not quite impossible, realize this and hurriedly retrieve him.

In some ladies' bowers will be seen many mutilated males too weary to make any attempt to escape, and perhaps, close by a few more lovers hung up to ripen.

Death Feigning

Death feigning is a very common defensive habit amongst spiders. When in danger they at once drop to earth and lie there crumpled up as if dead. Water spiders will behave in a similar manner in the water.

Whilst feigning death, a spider can be handled,

lifted up, rolled to and fro, without showing any signs of life.

Spiders when attacked by their own species do not use this method of defence, perhaps realizing that common knowledge is dangerous. When attacked by their own species they fight or run, more often the latter. (See Spider Fights.)

Spider Surgery

Should a spider be bitten in a limb and poison be present, the animal will often tear the limb off and throw it away. The operation seems to cause little or no inconvenience, and a spider with only two legs will yet manage to weave a web and live to the next moult, when new limbs will appear.

Longevity

The age to which a spider will live is not certain, but examples are given of as much as thirteen years. Four years is also given as a long life.

Spider Fights

There is a vast difference in Spiderland between a powerful spider meeting a young spider; a lady meeting a diminutive male; and an adult male meeting an adult of similar powers.

When two males meet evenly matched of worldly

experience the fight which follows often ends in "he that runs away lives to fight another day," only we must use the plural "they." Twisting their bodies in all directions, with much waving of front legs held well above the head, they circle round and round, making occasional advances to come to grips and as quickly making retreats to avoid such an emergency. As the battle proceeds the heroes draw further and further away, and then, forgetting what they were doing, wander off in opposite directions.

A piece of looking glass and a male spider will give a battle. The male spider is very brave when facing the enemy in the glass, perhaps because the enemy does exactly what he does, which is most annoying. His anger knows no limit and goads him to deeds of daring. As his enemy appears half afraid, he obtains increased courage. It is an opportunity to be brave without risk. They may be distinctly human-like; who knows?

Female spiders are different. When females fight it is usually a fight to the finish. There are no half measures, and nearly always a kill and a good meal follows.

It has been left to the poet to describe the spider and its traps; to the artist to draw its web; and to the fable writer to draw his moral. For these stories and pictures we have to give the poets and artists their due, for some spiders have the most

wonderfully designed webs, the work, I will suggest, of a thinking mind. But whilst artists, poets and fable writers have made a spider and a circular web synonymous, as if one went with the other, we must learn that whilst all spiders use their silk to weave the egg cocoon cases or nests, their tents, their tubes, many make no webs, and these beautiful webs are the work of a very few varieties in the spider world. Web building is a development; the use of the silk is originally for maternal purposes.

It is interesting to know that in the Dutch West Indies there is a spider which captures insects in the most curious manner, using web for this purpose.

It weaves a small patch on a leaf and then lies in the centre of the patch on its back. The web and itself so well resemble the excreta of birds that butterflies, which have the habit of settling on such matter, are mislead and on settling are captured.

THE SPIDER'S ANATOMY

Having learnt to consider spiders always with a web, it is difficult perhaps to realize spiders as a people who do not as a whole make webs, but who all can and do make silk.

Firstly let us remember that spiders are not insects, for all insects have a body divided into three parts, and have three pairs of legs, and a spider is not an insect because it has a body divided into two parts, and moreover, has four pairs of legs, all fastened to the front part. There is no insect about it except inside! The two parts of a spider's body, for there are only two parts, are:

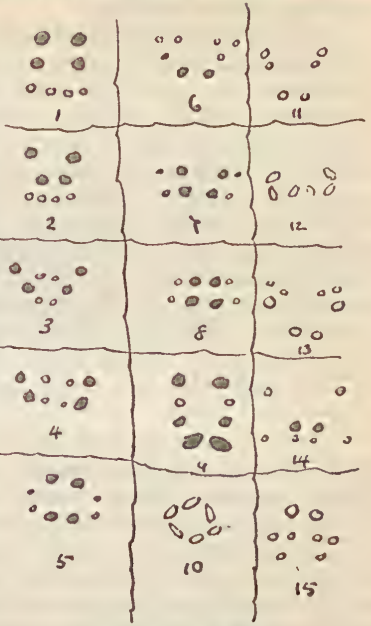
No. 1. "The Head and Chest" joined together to form one part, known as the Cephalothorax; and the second part,
No. 2. The Abdomen.

The head has a mouth, which lies between the rostrum and labium, and also fangs, poison fangs, which like a pocket knife have, as it were, the blade closing into the handle when not in use. The pocket-knife-like fangs with handle are the

falces. These falces are below the face, and are composed of the unguis (the hook), the paturon (the handle).

There are frequently rows of teeth on the paturon (the handle end of the falces), and when an insect is taken, the two paturon crush the insect between them. The mouth of a spider is very difficult to see, and it was thought for some time that the food passed up the falces.

The eyes of a spider are most original in their situation, and most interesting too, for British spiders have either eight or six eyes. The size and position of these eyes vary, and most heads have usually an assortment of sizes, some large,



GROUPING OF EYES.

Dark eyes, larger eyes.

1. Lycosa.
2. Dolomedes.
3. Philodromus.
4. Thomisus.
5. Argyroneta.
6. Veleda.
7. Clubiona.
8. Theridion.
9. Salticus.
10. Dysdera.
11. Scytodes.
12. Segestria.
13. Atypus.
14. Eresus.
15. Drasus.

some small. In eight-eyed spiders two of the eyes are usually degenerate, and may have returned to a rudimentary condition.

As to the arrangement of the eyes, some may be raised on small lumps, or may take up various positions on specially and somewhat curiously developed heads. In one or two varieties the head is so developed that it forms a high pillar, a sort of animated lighthouse from which the eyes have a point of vantage. (See Frontispiece.)

We find that whilst the eyes of the hunting spiders are clear and sparkling, the eyes of web-builders are often noticeably dull, and prove from experiments to be of not much value for seeing purposes. (See Web Building Without Light.)

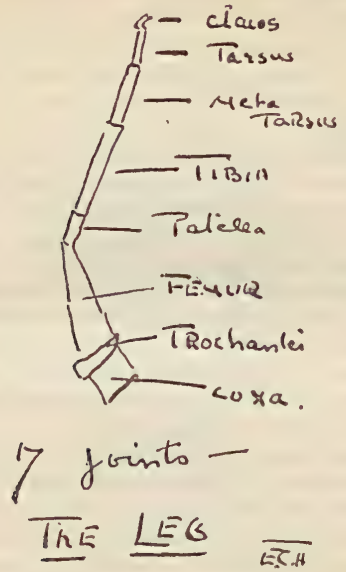
The spider's legs are divided into seven joints. The pedipalpi are very like legs, but have no metatarsal joint.

There is also present in the male when adult, and through its last moult, a special organ—the Papal organ. These papal organs take various forms and at once show the sex of the creature.

The spider's four pairs of legs vary in length, each pair to the other pairs, and it is by comparison of the length that we are able to add to our powers of identification, in order to tell Who is Who in Spiderland.

To show the variation between leg lengths, the numbers 1, 2, 3, 4, are used, to mean, as you will understand, that starting from the head end of

the creature the longest pair of legs comes first, the second pair are second in length, the third



pair are third in length, and the shortest are the last.

If the numbers were given as 2, 1, 3, 4, it would mean that the first pair of legs were second in length, and the second pair were the longest.

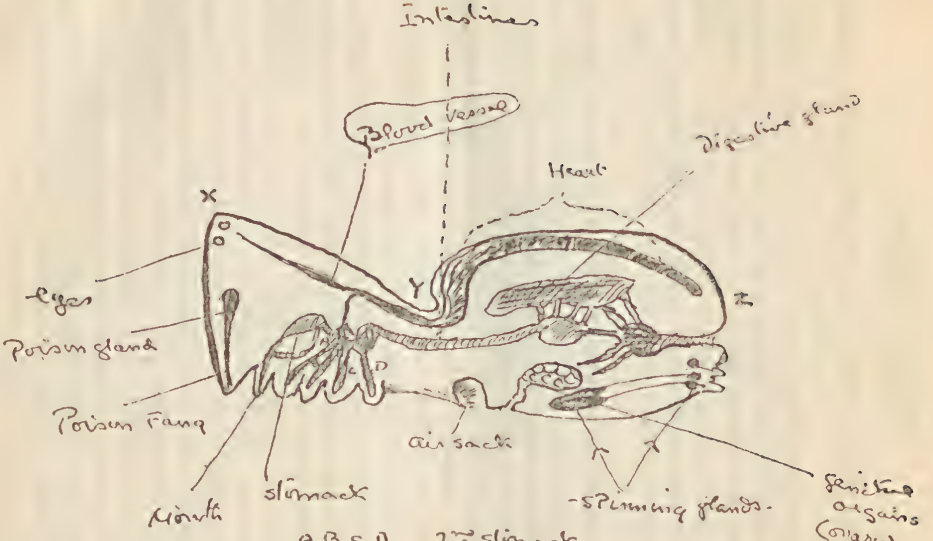
At the end of the spider's foot are two or sometimes more than two curved claws, which may be toothed along their edge like a comb. The foot of those spiders which live by hunting is of special type, for there is present a pad of hairs, which by means of a sticky secretion adds to its adhesive powers and allows the spider to obtain a good grip of any surface.

If three claws are present they are often of unequal sizes, and where there are more than three claws, one often acts as a thumb does in the human hand, working upwards against the other claws which take the place of fingers.

In the Ciniflonidæ we get a further development of the foot in the form of a special organ, a set of curved spines known as a calamistrum, and this double row of hooks is an essential tool used by the spiders of this group in the making of the peculiar webs which all this group excel in.

Before we leave anatomical detail we must say a few words about the cephalothorax. It is usually more or less oblong, but it may be oval or may be heart shaped, and it may be leathery, it may be covered with hair, or may be glossy and free from hair. The upper side of the cephalothorax is known as the shield, the lower side the breastplate. To save brain fag, look at the illustration of the anatomy, which will explain better than words.

When we talk of the cephalothorax base we mean



A SPIDER SECTION.

that part which joins the cephalothorax to the abdomen.

The abdomen may be of various shapes, narrow and long, short and broad ; it may be hairy, covered with long or short hair, or hairless and perhaps glossy. This again helps to identify species. Again, the abdomen may have various markings, brown lines, white spots, etc., and on the underside also.

On examining a spider you will see at the end of the abdomen, sometimes projecting well out at the back, two, three or four pairs of spinning organs known as spinnerets, which vary in length and form, and may be so jointed that they can turn and twist easily. The length and shape of the spinnerets and the way they are arranged will help in the identification of spiders.

To see the breathing apparatus you must examine the lower side of the abdomen where two apertures appear, one each side of the centre, the stigmata, the openings through the air passes. In these openings are gill-like plates. The heart on the upper side of the abdomen pumps the blood through vessels which run to the gills, and as it does so, opens and closes the gills, allowing air to enter one moment to oxidize the blood and pushing waste air out the next. (See illustrations, pp. 33, 37.)

The spider's digestive tract is interesting, and is divided into three portions, the stomodæum, mesenteron (mid gut), proctodæum (hind gut).

The stomodæum consists of the pharynx; the œsophagus and sucking stomach.

The mouth leads to a large peculiarly-shaped stomach, which has ten tubes radiating from the centre, and below is a second stomach. The spider, of course, also has a liver and various other organs found in animals. (See illustration p. 33.)

Palpal organs.—See illustrations on page 43.

These organs, which are only present in the male spiders, are of various shapes and sizes, and consist of a globe-like structure containing a short tube, ending in a bulb and projecting as an open tube. They are so large that they at once give the sex of a spider.

THE LIFE STORY OF THE SPIDER

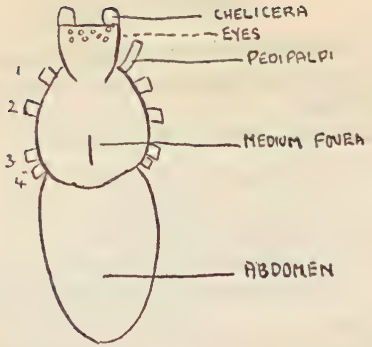
Spiders begin life as eggs, and on hatching grow rapidly, changing their skins frequently. Before they grow up they moult as many as eight times, and each moult is a very difficult and dangerous operation. During this operation many a spider dies, and many a limb is lost, subsequently to be replaced at the next moult. That is the reason why spiders with one leg out of keeping with the the rest are frequently to be met with.

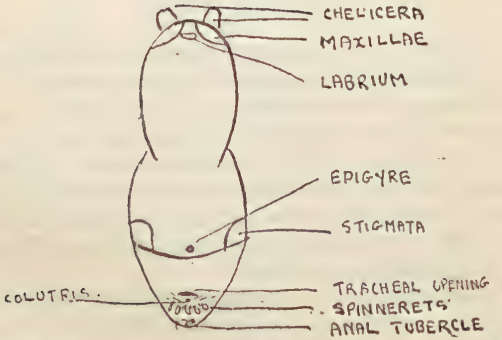
Whilst young male spiders of the web building varieties are good web-makers, adult males are not.

The epigyne-genital opening is only visible after the last moult, when the spider is adult. (See opposite.)

The British Araneidæ (see the story of Arachne the unfortunate lady) are divided into two main divisions, those with eight eyes (Octonoculina) and those with six eyes (Senoculina), and these eight-eyed and six-eyed tribes are again subdivided into numerous families and genera.

To know your spider, first of all count his or her eyes. A pocket lens is needed. Notice their arrange-





The upper side of the cephalothorax shown in the top illustration is called the shield. The lower side is called the breast plate.

ment. Note the colour, shape, size, the comparative lengths of legs, and the way the legs are carried when at rest.

When examining eyes, notice :

(1) Number of eyes.
(2) Size of eyes.
(3) Position of eyes.
(4) Distance between eyes.
(5) Distance from lower edge of face.

MYGALIDÆ (Family I.)

Genus 1.—Atypus

Atypus Piceus

This, one of the largest spiders we have, is the only British representative of a family of great importance in the tropics. It is curious in having a pair of falces which move up and down. Falces move sideways in all other spiders. The female is over half an inch long, the male one-third of an inch. They are dark brown in colour, and of such a curious shape that they cannot be confused with any other British spider.

Unfortunately, this most interesting spider is rare, but you may see his or her home on some bank amongst the fallen leaves. It is just a white silk tube projecting out of a hole in the earth.

If the end of this tube is open, you will know that it is the home of the gentleman Mr. Atypus; was his home perhaps, because he may have foolishly set out to court some lady, egged on by that noblest of all passions, and gone, like many a man into danger out of which there may be no return. For whilst lonely in his cell with its open door, all at once something had come and told him that elsewhere a lady of peculiar charm would welcome his presence. That is why he sallied out. You may meet him, an ungainly fellow of weird shape compared to the usual spider, wandering over the leaves and under the leaves on his way to visit the lady. He climbs over obstacles in his path, runs short distances at a time, stopping then to think, perhaps to reconsider the pros and cons of his visit. He is searching for the house of the female spider—a silken tube, without an opening, without a door, a closed tube. On seeing the end of a tube he stops, for this is the place he has been seeking, and now he has arrived.

There is, as we have seen, no door, no way to enter, and there is merely that silken blob, the closed end of a silken tube projecting from the earth. Mr. Atypus goes up to it, and knocks. At first it is a very gentle knock, just a gentle touch, and he stops to wait results. No answer! He knocks again, and then again, and still there comes no reply. Gradually he becomes impatient; he knocks again; he cannot wait any longer, his patience

gives out; love overpowers him, and forgetting everything, he wildly tears the web and enters.

Something runs up this tube, passes him, and the torn web is rapidly repaired, and this done, Mrs. Atypus turns to meet him. He, like all who suffer from this fell disease, is far too sentimental to realize where he is and stands waiting there foolishly, and when the lady turns to greet him, he tries indeed to be extremely pleasant. He bows, bobs his head, scrapes, lifts his palpi, and as he does so gets closer to the lady. His antics become more impressive. He tries to touch her, caress her with just the tips of his toes; he bends his body sideways, and moves nearer and nearer. Then the lady seizes him, has him in her arms, and buries her fangs deeply into his body, and down into the living room of the tube (which is like a cabin) he goes and there is eaten, or perhaps if her ladyship is well fed, is left to be used some other day, a change from worms, earwigs and beetles, when there is the appetite.

How the female Atypus inside her sealed-up tube managed to obtain food was a mystery for many years, but it is now known that when an insect bumps up against the entrance, the spider rushes up to the end and there grabs the victim, dragging it into the web through the tube, tearing the tube to pieces in a wild frenzy. The victim safely inside, paralyzed or so injured as to be unable to move, the spider sets to work to mend the broken

end of her trap. Then she feeds and is ready for her next visitor.

Well, to return, after many lovers have come and gone, or lie dead in her living room, there comes a day when another suitor arrives and knocks as is usual, gets impatient, and enters without ceremony by the simple method, already described, of tearing open the tube. As has been done many times before, her ladyship repairs the damage and turns to meet him. On this occasion it means the making of a pillow, carefully woven to prevent the eggs from getting damp, a pillow made with grass, and then it means a crowd of small eggs laid in an egg bag. And Mr. Atypus lives there too, a fortunate man indeed, happily superintending the great work.

The time at last comes when the eggs hatch into a swarm of youngsters—a hundred and forty children arrive, and when they are hatched they live happily for a time on the good things which their fond mother supplies. But a day comes when her temper alters, and then the children make their way to the end of the tube and bite their way out; they climb up the nearest object to give them height, and set sail and float away. Their hurry is very necessary, for their fond mother is more than likely to eat them if they remain within reach—a short life, too short, hence the haste.

As to poor Mr. Atypus, he remains, for Mrs. Atypus has loved him well; she has intermingled him into her very system. What could be better

for an old husband than to be part of his wife? How much better to be part of her when, on the morrow, youth, edible or lovable, will once again come knocking at the door!

LYCOSIDÆ (Family II.)

Genus 1.—Lycosa

Wolf Spiders

These spiders are, perhaps, the most perfectly built of any, and show, if we can judge it rightly, the most marked intelligence. They are also exceedingly strong, and many of them are striped with dark bars so that they blend with their surroundings. They are mostly brown or greys. They are a group of marauders, living anywhere and anyhow, spending their days wandering here and there, searching for victims and, on finding one, hunting it down by running it to its death. At night these spiders shelter beneath stones and sticks and hide away in the loose bark of fallen timber, and a few varieties dig temporary shelters —short holes in which they hide until the morning. They are a group of very active, energetic creatures.

The females of this family carry their eggs in a cocoon attached to the spinnerets; and when the family hatches, the babies climb up the legs of their mother on to her back, and remain there, clinging

PALPI AND LEGS.

Pachgynatera palpus. Leg showing Calamistra. Walckenaera male palpus. Epeira male palpus.

Philodromeus. Ped and Claw. Atypus male palpus. Pholcus male palpus.

Walckenaera palpus. Foot. Calamistra of Ergatis.

head downwards to the hair, whilst she carries on her daily life, and until they are old enough to start life on their own.

Or, their residence may fail, for their mother may meet with "an accident," which frequently happens, and during the combat the poor little things are dislodged.

Should a mother with her family on her back meet another lady burdened in a similar manner, they must, of course, stop and compare families, life histories and relatives, and from what happens we must conclude that their words lead to blows, for a great fight follows. The children hold on at best they can and as long as they can, but it is a very serious business indeed, and however hard they may cling they are gradually dislodged a few at a time and, falling on to the earth, hurry into the grass to hide.

When the fight is over, and the winner ends the war by sucking all the liquid out of her late enemy, an anxious crowd of tiny children peer from amongst the grass and from behind stones. Gradually overcoming their fear, they come running out and climb on to the spider's back. They worm their way up her legs, clinging on to the hairs until safely on board.

Then, when the inclination moves her, the mother starts off on her travels once more, and on her not only go her own children, at least those who returned in time, but also as many of her late

enemy's family, perhaps the lot, who also returned. Such is the result of victory in Spiderland. So it is that babies may be several layers thick on some heroic mother by the end of a long and victorious journey.

However thick the layer may be, the young spiders are always most careful to keep well away from the mother's eyes, realizing, perhaps, that a blinded vehicle means most dire results; heads for disaster too frequently to remain pleasantly exciting.

Wolf spiders are out hunting from daylight to dark. They are one of the first day spiders to get up in the morning and are one of the last to go to bed. Very quick, very keen, and seldom leaving go once they have seized a victim, they hurry along, following such prey as a small beetle, running after it, awaiting an opportunity to come to grips.

History relates incidents of wolf spiders, seizing an insect far too strong for their size and weight, rather than leave go, have been carried into the air by their quarry clinging, turning and twisting, trying by every means to get the fangs well in, before it is too late. Such dramas frequently occur, and occasionally a wolf spider, clinging to its prey, will go up into the sky and, at last succeeding in getting the poison fang in, will come crashing with its prey to earth on a last journey.

Amongst wolf spiders maternity means first the making of an egg cocoon in a chamber dug in

the soil, a chamber carefully concealed and fastened up during the operation by a silken curtain. The female spider has no wish to be attacked, or give away her secret to prying eyes.

It is thanks to Mr. McCook that we know the story of the making of the cocoon, for he watched a female wolf spider build her nest in a glass jar. As soon as placed on the soil, the spider at once dug a passage down, and, fortunately for him, chose to do so up against the glass. No sooner was the passage dug than the spider wove a curtain, closing up the entrance.

Satisfied that she would be safe from interruption she set to to weave a sheet against the upright wall. Then in this sheet she laid her eggs, pressing them well in, and seizing the corners of the sheet, pulled them together and towards her, forming a bag, and wove the ends together. A case for this bag was needed. The Lycosa, weaving one side and then the other, gradually made this bag, being careful to leave a narrow portion thin by weaving less at that particular part. It is through this part that the youngsters will bite their way out.

The work done, the little mother fastened the cocoon to her spinnerets and, biting away the curtain, hurried out into the world.

The colour of the cocoons is either white or various shades of brown merging into greens. The cocoon is either a quarter of an inch, one-fifth, one-eighth, or in one variety is one-sixth of an inch, and

one-seventh of an inch in diameter. The eggs are various shades of yellow, from the deep yellow eggs of piratica to the pale yellow eggs of rapax. The cocoons are characteristic; they are all what is termed zoned, that is to say that, like an Easter egg, they show where the two sides are joined together and at this zone the youngsters bite their way through.

Experiments show that the female Lycosa does not recognize her cocoon easily by sight, but knows it better by touch. The maternal feelings for their cocoons are very real, and when in these experiments their cocoons were taken away the poor little creatures exhibited every sign of pained anxiety, searching all round the spot for their eggs. In some experiments the cocoons were placed so that they could find them easily, and the spiders did not recognize them until quite close. As soon, however, as they realized what the object was they were delighted and hurriedly commenced to fasten the cocoon to their spinnerets.

It was found that after sixteen and a half hours the spiders still showed signs of affection for their egg bags, but after twenty-four hours they no longer cared for them. In one experiment a piece of shot was placed in the cocoon, and the brave little mother at once attached it to her spinnerets. As the weighted cocoon broke loose the spider re-attached it, and then clinging on to it with her legs struggled away, dragging this colossal encumbrance with her. (Warburton.)

Wolf spiders are very common indeed, and during May and June the fallen leaves often appear alive with them. You will meet these wolf spiders running out from their shelters, climbing over pieces of timber, negotiating the twigs which lie there. Later in the year you will see most of them carrying their egg cocoons—little grey flattened bags which project behind their abdomens.

Whilst spiders as a rule are very sensitive to vibration, the Lycosa appear to take no notice of sounds, relying entirely on their eyesight.

Most wolf spiders are homeless, and live the life of the free, visiting new spots and making temporary shelters, but there are some which live in tunnels in the earth, long tunnels lined with a web of extremely fine texture.

One of these, Lycosa picta, a red brown and somewhat mottled spider, lives happily in a colony in large numbers in the sand hills. It is so mottled, and blends so well with the sand that it is scarcely visible. The males are marked like the females, but are darker. It is one of the most charming of the wolf spiders.

The making of these little homes in the sand has been a great undertaking, for each little creature has dug its own passage, carrying out the sand grain by grain in its mouth. So the passage has been finished and lined with a fine silk sheet to prevent any sand from dropping in again.

An exceptionally fat picta, moving slowly because

of the weight she bears, tells her own story. She has collected the families of several, and the babies, two or three layers thick, give her the corpulent appearance.

When the young are born they climb on to their mother's back, and as the parent creeps up and down the tube on her way to and from the world outside, the babies hold themselves close to her body, so as to avoid being brushed off. It is said that often they dismount and follow their mother down.

They, like all young Lycosa, go out on great hunting expeditions. Their mother wanders off, running down a victim, and if successful, kills and feeds, and the children sit there quite happy all the time. As they grow older they wander away to hunt, and the mother sends them to seek adventures when old enough to start.

Wolf spiders vary in size from those one-fifth of an inch to others less than three-quarters of an inch long, and the males, which usually are not much smaller than their wives, are of a darker colour, whilst some large varieties exist about a quarter or one-third of an inch long.

As a rule they prefer to live in woods, and on commons, but some live by the sides of ponds and rivers and on the marshes and meadows.

The Lycosa have eight eyes, four large and four small in three rows, and the arrangement of their eyes is very similar in all species. The larger eyes

nearly always form a square more or less, and the smaller eyes make a crescent.

The various types can be recognized by (1) the size of the eyes, as compared to the position they hold; (2) by the shape of breast-plates; and (3) by the colour and various other characters already mentioned.

L. agretica lives on the open heaths and meadows, and whilst hunting freely part of the year, digs a hole and makes this her home during the breeding season. Her cocoon is a quarter of an inch in diameter, and oval. It contains about one hundred yellow white eggs. The eyes of this spider vary only slightly in size; the front row of eyes is longer than the second row, and the two eyes in the centre of the first row are larger than those at the sides.

L. andrenivora; L. rapax; L. herbigrada; L. allodroma; L. picta; L. saccata; L. lugubris; L. obscura; L. exigua; L. fluviatilis; L. cambrica; and the marsh-loving species L. piratica (one of the bravest of these wolf spiders) as well as piscatoria have all heart-shaped breast-plates.

L. andrenivora, one of the largest of the wolf spiders, is half an inch long. It is found on the commons—a brown spider, noticeable perhaps by its curious tufts of pale coloured hairs which appear on the abdomen; the male of this variety is nearly grey in colour, and has very dark palpi. The outer eyes of the first row are rather widely separated, both in the male and female.

L. rapax has a wrinkled shield, and on the abdomen is a dark streak which goes all the way to the spinnerets, and the front line of eyes is slightly shorter than the second row. The eyes are also further away from the lower edge of the face than in L. agretica. It is often to be seen on commons, but it seems to prefer the woods, and here you will meet many of the wives carrying their cocoons, pale crown coloured objects. Whilst the males seem to enjoy sunshine, the females prefer the shade. The female rapax is not quite so large as andrenivora, and the pale brown colour of the cocoon makes identification during the breeding season easy. Both male and female are similarly marked.

L. allodroma, which is a more or less local species, has been found in Wales, and in the North of England, living close to waterways. It is a quarter of an inch long. The females are greenish brown, whilst the male is of a pale brown colour with an abdomen yellow brown below. The breast-plates have white hairs on their surface.

L. obscura, one quarter of an inch long, lives in fields; it is a late breeder, forming the egg cocoon during the autumn. The portion of the cephalothorax in which the eyes are borne is in the male very dark brown indeed. The male and female are very much of the same size, the male being darker in colour.

Lugubris, the wolf spider of the woods, has a flattened cocoon of green or brown colour with a

white ring where the inner sheet shows the part of the case through which the youngsters will find their way. The male of this variety is black marked with white hairs. In June they appear in large numbers in open spaces in the woods when the sunlight is warming the earth and rest enjoying the warmth, but the passing of a cloud causes these spiders to hurry under the leaves, re-appearing again as the sun shines out once more.

Exigua is such a common variety that it is met with everywhere. Its brown or green cocoon is over one-seventh of an inch in size and has a white ring. Exigua is a great aëronautic enthusiast; it loves to take aërial voyages, and off it goes to float in the air, attached to a "plane" of silk, wafted along in the eddies and currents it meets with. Should, however, the wind develop and appear to be carrying this small airman too far or too high, the spider, realizing the emergency, draws in its sail, gathering the silk together in its legs and rolling the silk up, comes down to earth again.

The wolf spider, L. piratica, a yellow or red-brown spider, is one of the most interesting. For this spider, one-third of an inch long, lives close to ponds and streams, and hunts not only on the surface of the water, but actually goes down into the depths below after victims. Seeing a water beetle it makes wild and foolish attempts to seize

the insect, but being an indifferent swimmer, fails each time. It clearly prefers to hold on to plants than to rely on swimming. Piratica preys on the young gnats and dragon flies. Thanks to the close hairs on this spider's body, an air shield prevents the water from coming into actual contact with its body.

Let it be remembered that although piratica enters the water it must not be confused with the real water spider, A. aquatica, with which we will deal later. In habits and also in appearance confusion is impossible, for Lycosa piratica is a narrow-bodied, lightly built spider, whilst the water spider proper is of a round short type.

What happens to the Lycosa in winter time? When winter comes, the wolf spiders dig holes in the earth, coming out when the weather is genial. Some hide under the bark of trees, and stories are told that under thick ice, wolf spiders have been found running over the water seeking food.

Lycosidæ (Family II.)

Genus 2.—Dolomedes

These wolf spiders, often striped to harmonize with the vegetation amongst which they live, devise stratagem, so at least their name tells us. They also carry their egg cocoons with them wherever they go, but it is not attached to the spinnerets

as in the case of the Lycosa, but is attached to the body. One of the Dolomedes constructs a raft by weaving leaves together, and on this the spider sets "sail" and, lying quite still, leaps on to the water when the raft floats within reach of an insect.

The largest of this genus is Dolomedes fimbriatus, a largely strongly built hairy spider, dark brown in colour, with a yellow white band down each side of the shield. The female Dolomedes fimbriatus is three-quarters of an inch long. It has very long legs, the femor joint, the fifth from and including the toe is more than usual length. The eyes are some distance from the lower edge of the face, which stands out. This Dolomedes lives a similar life to the pirate Lycosa piratica already dealt with, remaining close to the waterside, hiding in the grass by the ponds and streams, and bravely chasing its prey on to or even under the water, and at other times hunting the land, following the weakly fly, hunting down the dying and the mutilated and the vigorous. Like L. piratica Dolomedes fimbriatus chases its prey down with the marked persistence so noticeable in these families.

The egg cocoon of this species is carried under the breast-plate, but as hatching time approaches, the mother carries the cocoon to some suitable spot, climbing up the reeds or rushes by the side of the stream. She then attaches the cocoon and weaves all round it a confusion of lines. The young

when born are green in colour, and very active and grow with extraordinary rapidity, and all the time the parent remains with them on guard.

But of all the Dolomedes poor Mirabilis, the Home Builder—a spider about half an inch long—takes our sympathy, for whilst living the life of the free, she has by necessity to carry her huge cocoon attached to her breast-plate. It is a cocoon so very large indeed that the poor little thing has hardly room to walk, and must consequently do so on tip-toes in order to keep her precious eggs a safe distance from the ground. Sometimes she drops it, and her husband hurries up and picks the cocoon up in his arms and, just because he is smaller than the female, strains his legs to the uttermost to keep going at all.

It is the Home Builder who varies the story of these wolf spiders, by breaking the usual rule. Perhaps she is tired of convention when such convention has outlived its meaning, for when the time approaches for her eggs to change into a large family of exceedingly active children, the mother commences to weave a large web sheet and fastens it to the grasses or amongst the twigs of conveniently low bushes. Into this house the mother retires, and in due course the babies arrive. Mrs. Dolomedes remains hidden there with them.

Every now and again you will see Mrs. Mirabilis take a look out of her home as if undecided whether to risk leaving it or not, and then all at once making

up her mind runs out and drops to the ground below, hoping that she has not been seen. As soon as she reaches the earth she does not waste a moment, but hurries into the grass, full of endless misgivings as to the welfare of her family. Food is, however, a necessity. Whilst the mother is out, the babies cluster so closely together and remain so very still that to all appearances they are dead. Perhaps they are terrified by so much that might happen, or maybe they find warmth and comfort in close quarters.

At last, madam, filled with blood, returns and climbs hastily back into her home, and the children come to life again and welcome her with great rejoicing.

So life drags on, and Mrs. Spider, living there patiently, waits for the day when her babies will no longer need the comfort and warmth of her presence. Then she will be able to return to her hunting without any of those haunting fears which even the smallest of mothers feel when their offspring are without them.

A few days later some of the family venture out, then more go, and still more until at length they have all gone, and only the dome-shaped web sheet remains and an accumulation of empty skins.

The first moult takes place in the nest.

Dolomedes mirabilis is common on heaths, commons, upland pastures and in woods. Male and female are very similar in their marking, the male being more distinctly marked and darker.

Lycosidæ (Family II.)

Genus 3.—Hecaerge

The Hecaerge, the interesting spiders of "action from afar," of which spinimana is commonly met with in the woods, are agile little creatures responsible for many of those little puffs of cocoons which are lightly fastened to the undersides of stones. These spiders live in the woods, amongst heather and also in damp moss. They are always busy, always hunting, always in a hurry, climbing up the brambles or dashing round a tree trunk searching for some foolish insect dreaming of anything else but the spider preparing to spring. It is very foolish of the insect, but there it is. Spinimana has teeth on its claws, and a hairy brush or pad below the claws, which comes into action, no doubt in the making and the attaching of the egg cocoon.

Whilst Blackwell places this spider amongst the Lycosa, Pickard-Cambridge states that it is generally agreed that its proper place is amongst the Drassidæ.

Lycosidæ (Family II.)

Genus 4.—Sphasus

The last of this group, Sphasus, the Butchers, are strange little creatures a quarter of an inch long and, as might be expected, extremely active. They

are noted for their cephalothorax, which rises to form a somewhat large protuberance on which the eyes appear. When they get within a suitable distance they all at once gather themselves up into a tiny lump and hurl themselves through the air on to their victim. They also move from place to place by taking prodigious leaps. They are very similar in their habits to the Zebra spider, with which we shall deal later.

Sphasus has two large eyes below which are two small ones, and the rest of its eyes are arranged in front of the large eyes. (See illustration.)

Their sharp little eyes prevent any mistakes as to distance and the position of the spot they wish to land on.

Sphasus never makes a web, but like all the wolf spiders, carries an egg cocoon.

Legs. 1, 2, 4, 3.

SALTICIDÆ (Family III.)

Of all the interesting spiders, the Salticidæ are perhaps the most fascinating. They are the leaping spiders. The family is divided into two main groups, the Salticus (I carry plumes) spiders or leapers, the most vividly coloured of all our spiders, and the Eresus spiders (I will fix). Of the latter there is only one British variety.

THOMISOS CITREOS

THOMISUS.

THOMISOS ABBREVIATOS

SALTICUS CUPREUS.

SALTICUS SCENICUS.

SALTICUS.

[F.E.H.]

They are, one and all, exceedingly agile, leaping on to their prey with great dexterity.

The Zebra spider, S. scenicus, striped with black and white, so as to assimilate with the walls on which it builds, is so common that it affords an excellent example, for not only can we all recognize it, for its markings are so original, but we are certain to find one or more on the top of the first gate, or any wood fence or wall we examine. It is a spider you cannot miss, if you can recognize it.

Both the Eresus and the Salticus spiders are of somewhat peculiar shape, for they have a broad cephalothorax with more or less parallel sides, far larger in proportion to the abdomen than is usual with spiders. The heads also are somewhat curious, for Eresus has a head shaped rather like a sea urchin, and the eyes are arranged so that two are on the outer edge and a further two large eyes appear in the centre, with two very diminutive eyes just below them.

The Salticus have the most enormous eyes, and two of these monster eyes are in front and one large eye each side, and behind these on the top of the head are two small eyes with a further two larger ones behind them. They have, in fact, the most powerful eye battery in Spiderland, and what is more they make the very best use of it.

It is certainly remarkable, considering the size of this spider, that a jumping spider can see a fly eight inches away. Should an insect fly over, it

is at once noticed, and the little spider raises its head as high as it can, and turns quickly to see where the fly settles and then it starts to stalk.

Salticidæ (Family III.)

Genus 1.—Eresus

The Eresus is a spider one-third of an inch long, and its eyes are arranged as follows: the four on the outside form a box-like pattern, whilst the smaller eyes form a similar pattern behind and between the two lower eyes of the larger box.

Legs. 4, 1, 2, 3.

Although often capturing its prey by pouncing on its victim, it also builds a snare, fastening long threads between leaves and twigs. Mrs. Eresus then sits close by hoping and waiting patiently for a fly to become entangled. After some time, if still unsuccessful, she will hurriedly leave the trap and set out on a hunting expedition, but sooner or later, on seeing a tempting spot, she decides to give up hunting and draws out once more a numerous series of threads and sits and waits.

Eresus is very rare indeed, and unfortunately most of the Salticus genus are also very uncommon, except for Salticus scenicus, the Zebra spider, which is very numerous, and it seems strange that the entire group should be so rare, except for a few members, who are perhaps the most common spiders to be met with.

Salticidæ (Family III.)

Genus 2.—Salticus

If you know where to look for S. scenicus, he is there, sure enough. The name Zebra is on account of its black and white markings. The female is a quarter of an inch long, the male slightly smaller. When searching for prey they evince the skill and dogged determination of the Red Indian hunter of early Canadian days. They use every precaution to be well hidden and yet keep well aware of the movements of the object under attack. They use all the arts of the hunter, running rapidly along the top of a fence or wall, suddenly stopping to raise or depress their bodies, aiming a battery of eyes in every conceivable direction. Suddenly the head, which has been turning all ways so as to make perfectly certain of the situation, is held still for a moment, for something has attracted attention. Very slowly the spider lowers its head, as if it realizes that a quick movement is more noticeable and slow movements pass unseen. Then very gradually the little creature moves off "one leg at a time," every action marked with caution. It steps down into a crack and runs as fast as its legs can take it, and then stops to have another look, climbing to the edge of the crack for this purpose. Then down it goes again. Another short run and once

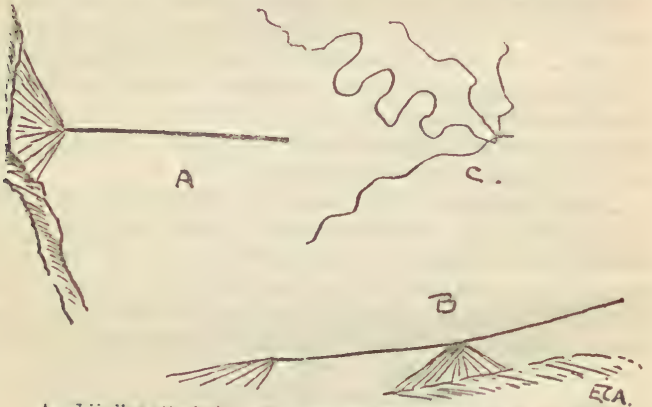
more it stops to see its quarry, which no doubt is happily sunning itself, quite unconscious of approaching danger. Realizing that irregularities of the surface offer cover, the spider takes all advantage, going well down into the hollows, and running rapidly in the cracks, never forgetting to come out every now and again to have a look at the insect. As it gets nearer to the object it prepares for the climax. It fastens a line by means of an anchor to the wood, and runs up again to stop to fasten the line once more, so it gradually pegs down the line by means of a number of ropes to the woodwork in little groups here and there.

Now it gathers itself together, all its tiny muscles are tightening, in a moment it will leap, hurling itself with extraordinary precision on to its quarry. And if you are watching you will see that in less time than it has taken you to read these lines the small spider has leaped, has landed and has driven its fangs deeply in.

The life line attached to the woodwork before the leap was needed, for what if the spider had missed? What if it meant leaping sideways, or downwards, or upwards on that wood? It might have missed and leaped into air and fallen to earth below. When Scenicus misses he swings happily to and fro, until the momentum ends, and then merely seizing the line, the spider climbs back on to the gate to start once more the search for a victim.

For applied intelligent methods, these spiders

when out hunting have few equals and still less superiors. Following a fly inch by inch, standing still each time the fly lifts its wings and shows signs of taking flight, the hunter moves along, being careful to take quick glances over its back to make certain that no one else is out hunting too and



A. Life-line attached. B. Further attachments before springing. C. Gossamer.

reversing the story. If Scenicus sees someone else out hunting who has chosen "him" as a victim, the spider makes haste to escape and leaves hunting for a more suitable occasion.

When a jumping spider is in love, hunting is forgotten and love makes the little ardent hunter the most foolish and amusing, and certainly a most

irresistible and fascinating little mortal. Every thought, every ounce of energy goes to one purpose, every effort is made to give good impressions. It is all expressed in varied attempts to dance like no one else has ever danced before. The spider, small though he is, wishes to show that he too is dexterous, neat, original and charming, he wishes to prove to the lady watching him that his longing is real. Nothing matters now but good impressions.

He may even be actually engaged in tracking down a green fly, when all at once, looking over his shoulder, he stops and stares, for he sees a lady standing there. He is still very cautious, but he manages somehow to take another look and, satisfied that he is not mistaken, moves a few steps nearer, and suddenly vanishes in a crack. A moment later he re-appears to have another long look. You can nearly hear him say: "Yes it is! Yes, it is!" It is a lady of his own species also hunting, tracking down a gnat, occupied in testing wood for juices.

But all hunting comes to an end, for the gentleman runs towards her, stops, fixes her with his battery, makes rapid decisions as to her appearances, feeling of companionship, domestic ability, which may mean perhaps as much to spiders as it does to man.

He is satisfied, more than satisfied, delighted; his feelings carry him away from earthly things, everything is forgotten in that one great joy. He lifts himself up higher and higher, he is only small,

but rising on his toes, and lifting plumes on his head, makes him feel a great, big spider. He lifts his front legs high up, and holds them above his head. He starts to dance wildly, he dances towards her, and he sees effects. For the lady stands quite still to look at him, raising her head slowly and even turns to watch him as he dances past. He becomes braver, he runs a few steps nearer, hesitates, stops and then, regretting his intrepidity, draws back. What if she took offence? The nervousness passes, he forgets everything, and abandons himself to his feelings. Dancing towards her he waves his legs and rolls from side to side. Bowing and scraping, drawing back, moving forward, rolling sideways, nearly falling over. Now on one side and now on the other he drags himself towards her.

The lady stands there, turning her head from side to side to keep him well in view, watching him intently, and each time he approaches, raising herself to warn him to take care. Madly in love though he is, he is not too blind to realize the folly of pushing his suit too far, and each time she rises draws back and stands there dejected, only next moment to forget and dance towards her again.

So gradually overcome with emotion, no longer seeing the warnings and becoming braver, he actually touches her with just the very ends of his toes, hastily withdrawing as she shows herself annoyed.

And so he goes on until at last, oblivious to

everything and dancing more madly than ever, he approaches, seizes her in his arms, and clinging to each other they whirl round and round in one wild frenzy. It all means a home, for the female zebra finds a crevice in a wall, a hole in a beam, a suitable opening in the bark of a tree, and in such place weaves a cocoon, perhaps two cocoons, about one-eighth of an inch in length, and both lenticular in shape filled with eggs. She remains with her cocoons, waiting patiently for the family to appear, to carry on in the good way that spiders have.

Salticus cupreus—a somewhat similar spider, coloured in various shades of black, brown and yellow, marked with green and white spots—covers her cocoons with particles of earth to hide its character from those prying eyes which might upset her home. They are very common, and spend all their free time, when not engaged in hunting or making love, in basking in the sun or leaping from plant to plant, preferring to jump across than run down and up again.

The Salticus spider, formicarius, which is very rare, but has occasionally been met with in the North, so closely resembles an ant that no doubt it is often mistaken for one of those insects. It has very large falces, and its legs, which have strong thick hairs on them, stand in the order of 4, 1, 2, 3.

When following its prey S. formicarius is so very careful that it hardly seems to move. It relies

on invisibility rather than on rapidity of motion. It is important that the quarry should see no signs of movement, for why should it be alarmed at a dead ant lying some distance away. A dead ant indeed! See this dead ant—creeping slowly, so very slowly along the boards that you can only see that it has moved by noticing its position from time to time.

But when danger threatens; then this little spider so painfully slow proves that it can move quickly if needs should prompt. It raises itself, and after taking in the situation at a glance, runs off as fast as any eight legs can take so small a body.

The nest of S. formicarius is a finely-woven bag, open at both sides, and in this the egg cocoon is placed and hatches into a host of curiously unreal spiders, resembling minute ants.

THOMISIDÆ (Family IV.)

Crab Spiders

The crab spiders, a family of small people, are not only crab-like in their appearance, but more so still in the way they move. They look crab-like because their thick legs are arranged at right angles to the cephalothorax. When these spiders run they go sideways instead of forward, although they can go forward if they wish.

The whole group is noted for their short and sturdy appearance, the length and strength of the two first pairs of legs. None of these crab spiders are very large, and vary in size from one-seventh of an inch to about half an inch. Although they are so very numerous and swarm everywhere, their size, their markings, and moreover the life they lead, has led this variety of spider to be missed by the casual observer.

The Thomisidæ are frequently mistaken for young spiders. They are met with everywhere; they use crevices in buildings, the bark of trees, the petals, sepals and bracts of flowers as hunting centres. They hide in the grass, preferring the loose heads of cocksfoot, Yorkshire fog, in fact, any spot which will give them the cover they require, for their hunting methods makes concealment essential.

When interfered with, crab spiders gather up their legs below their bodies and appear more like crabs than ever. They feign death, and will remain "dead" until the cause of their anxiety has gone.

Their life history is varied; some are homeless and travel from place to place, sleeping in convenient shelters; others again live within flowers, where, nestling down among the petals, they kill large numbers of insect visitors.

The whole group is remarkable for their protective colouring and markings, making them more or less invisible. It allows insects to come within gripping distance once only. The insect settles on the

flower, the petals move, and one "petal" draws the fly below. It is over too quickly to give the visitor the alarm. For a pair of very long legs rise slowly and seize the insect round the neck and draw it down.

Some of these crab spiders are great travellers, seeking adventures on the end of a gossamer, the quantity of web acting as a balloon, taking them considerable distances without effort.

The Thomisidæ include three groups—the Thomisus (I will bind) spiders, the Philodromus (I love many), and the Sparassus (Tearing spiders).

Thomisidæ (Family IV.)

Genus 1.—Thomisus

T. cristatus, the airman of the spider world, spends much of its life in aeronautic adventures, sailing here and there on its gossamer. When not out sailing it is very busy arranging lines in all directions from chosen positions of concealment, usually behind a leaf to various objects in the neighbourhood, and then, settling patiently, waits until a fly gets in. Its diet is varied, anything eatable and safely attacked is suitable provender.

Like many others, it readily attacks young spiders whenever they come within reach, and as young spiders love to climb in just the kind of places where T. cristatus usually hides, no doubt T. cristatus is

responsible for a very large number of the missing in the spider kingdom.

The damage done by this crab spider during the summer, when the youngsters are everywhere, must be colossal. Perhaps that gives a good reason why so many young T. cristatus are found sailing in the air. Some days the air is flaked with white, as a host of these youngsters sail away, each attached to its wisp of white web. Home life is distinctly dangerous, especially when recognition is difficult and when maternal and parental feelings are so acutely alimentary.

T. luctuosus, a somewhat uncommon spider, weaves two leaves together and fastens her cocoon in the centre, and remains there until the family are old enough to look after themselves, whilst the somewhat rare spider T. erraticus attaches her cocoon to the under side of a dead leaf. Both these spiders have similar habits to cristatus.

The crab spider, T. citreus, which has a noticeably short cephalothorax, loves to hide in flowers, and ensconced amongst the petals the wee creature watches all the time for any foolish insect who may stand long enough within reach to be seized. Citreus looks out every now and again, drawing herself up, climbing over the petals to be able to see all around in case the foolish insect is there.

Madam Citreus is a greenish brown or yellow brown spider, with a green band on each side of its shield, and looks very much like part of a plant

vegetation. She has black claws. The husband, poor dear, who is only half the size of his lady, just one-sixth of an inch long, is such a weak sickly-looking individual that if it was not for his beauty he would pass unnoticed. As it is, small and weakly though he be, his striping in green and black along the shield and abdomen of a reddish brown colour make him quite a little gentleman. As if Nature wished to give him something peculiar to make up for his insignificance, he is curious in having the first two pairs of legs brown and the other two pairs a green colour. The length of the legs in both male and female are 1, 2, 4, 3.

Thomisidæ (Family IV.)

Genus 2.—Philodromus

The second group of the crab spiders Thomisidæ are the Philodromus, the "love many" spiders, why so named I do not know. Their eyes are very small and take the form of a crescent. Their legs are rather long. P. cæspiticolis lives on the heaths. Her nest is a large structure, in which the two flattened white cocoons are placed. The mother remains with her eggs and takes a great interest in their welfare, and woe betide any egg-eating spider who may chance to visit her. To protect her treasures the female P. cæspiticolis will fight to the end, however hungry and savage the visitor may be.

The nest is not easily missed, for it is a bulky arrangement, with leaves and twigs drawn together to form foundations, to which the mass of web is attached. Often the cocoons are of different sizes, the one perhaps being a quarter of an inch or more in diameter, the other so small as to appear the property of some other spider.

PHILODROMUS

A CRAB SPIDER

To have a duel all you need to do is to push a hat pin with a small piece of cork or paper on the point into the female cæspiticolis' sanctuary. As soon as it comes in the spider is up and at it at once. The enemy is seized in its legs, the falces come into action. You can add greatly to the excitement and get a better battle if you insert a dead wasp, but for the sake of the spider it is as well to cut off the point of the wasp's sting before inserting it. Dead wasps, if more or less recently deceased, are most vindictive, quite

capable of using their stings, dead though they be.

Thomisidæ (Family IV.)

GENUS 3.—SPARASSUS

♀

SPARASSUS SMARAGDULUS

THE only representative of the Tearing spiders is Sparassus smaragdulus, a green spider which hunts its prey in the grasses and attaches her egg cocoon between the leaves woven together to form a shelter. It is one of the largest of the Thomisidæ, being just over half an inch long. The eyes, which are small, are placed on small protuberances, each eye having a protuberance for itself. It is interesting to know that the young males look very much like the females till they grow up.

The male Sparassus smaragdulus is a very handsome creature, green, yellow and scarlet, whilst the female is green, with a dark green band along

the centre of her abdomen, as can be seen in the illustration above.

THE DRASSIDÆ (Family V.)

The Drassidæ are somewhat elongated narrow-bodied spiders, of which there are some fourteen or fifteen varieties. Whilst most of them are sombre coloured spiders, some are very beautifully coloured. As a rule this family does not show the marked difference in size between the male and the female spider which is so usual in Spiderland, whilst in the water spider, A. aquatica, the male is actually larger than the female.

There are three families under this heading, the Drassus, Clubiona and Argyroneta, in the last of which is found the charming and original spider, aquatica, a source of constant pleasure to those who obtain it.

Drassidæ (Family V.)

Genus 1.—Drassus

D. ater, a dull black spider, except for the thighs and ends of its legs which are of a brown colour, is one of the spiders which comes out during the hours of darkness, and is hunting whilst the world, as a whole, sleeps. The female builds the home in the earth, or choosing the under side of a stone places her cocoons under its shelter, and stays with her

eggs until they hatch. The cocoon, two-fifths of an inch in size, is at first white, but gradually as it weathers changes colour, so that, as the eggs mature, it changes from white to yellow, and then slowly to red.

This spider is an early breeder, and May will see the female forming the cocoon and when most young spiders are having their first glimpse of this earth her family are quite grown up. They have a great advantage in this way, for they are out killing and feeding when most of Spiderland is in its infancy. The number of spools on the spinnerets varies according to the age. Specimens of Drassus ater when one-third grown had five or six spools, and those two-thirds grown had six or seven spools, whilst the adults carry eight spools.

Another black spider of this family is D. pusillus, which is of a deeper black than D. ater, except for its third and fourth pairs of legs. It can be recognized by the palpi, which in the female are red, and the ends of the first pair of legs, which are yellow. This is quite a handsome little thing.

Drassus lucifugus, a deep brown spider with black abdomen, which is responsible for two flat cocoons in a hole in the earth or attached to a stone, has a family of youngsters red in colour. It lives on the heaths and under the banks by the side of ponds, hiding in the holes and cracks. On the cephalothorax is a deep V-shaped black mark, the apex of the V pointing backwards.

Drassus sericeus is the spider of many an old mansion, where it stands motionless on the walls all day and only when disturbed runs across the ceilings. At night it starts off and wanders round the house searching for food or adventure. The female's abdomen is of a grey black colour.

D. lapidicolens, a very common spider indeed, is about half an inch long, and, similarly to lucifugus, only wanders about at night. The female takes great trouble to make a home, burrowing down below a stone and using the stone as a roof to her residence. Having dug the hole, she carefully lays threads in all directions close to the entrance, and this done she retires, sitting below the stone to wait. Every now and again a tiny insect comes to grief in the threads and is captured. And occasionally, of course, some large creature, such as a worm, passes and takes the snare away, and the spider sallies out to make a new web, much annoyed with worms in general.

The adult lapidicolens vary greatly in their size, mature females being met with nearly twice the size of others of the same species. The same applies to the males; they vary greatly. Whatever may be their size or age they are a very brave little people who, if handled, will make the most ferocious attempts to use their fangs to escape, and often jerk off their legs which you are holding and win that way.

In June or early in July the female builds her

cocoon, which is flat and cushion-like, and this done, attaches fragments of dead leaves to make it less distinguishable and hide its identity. It is a huge cocoon and being in consequence very obvious needs protection, for it is nearly half an inch in diameter. When the young hatch the mother remains with them, and you will see her standing patiently outside her home with the children running here and there, beneath her, a crowd of tiny spiders, dodging in and out.

Of all these spiders, D. nitens, adorned with iridescent scale-like hairs, is very handsome, for these scales give off beautiful iridescent colours at various angles. It is a smaller spider than the one mentioned above, the females being under a quarter of an inch long. It has dark brown legs, and on the abdomen, which is black and iridescent, are white dots, passing from the spinnerets to half way up the body. It is so very like a large ant in appearance that it is easily mistaken for one of those insects and, preying as it does on ants, this is much to its advantage. Taking up residence on or close to an ant hill, D. nitens thrives, to the discomfort, misery and disintegration of the owners of that area.

At nesting time cocoons about one-sixth of an inch long are made, and although the mother does not remain actually with her cocoon, she builds a tube close by and lives therein. D. nitens is very common, and will be found running along the ground during the summer.

Drassidæ (Family V.)

Genus 2.—Clubiona

The second family of Drassidæ, the Clubiona, contains several highly original varieties with developed cannibalistic instincts. In this family Mr. Spider is again much smaller and more slender than his wife, but all varieties are very like each other.

C. holosericea is very common in the woods, and hides beneath stones, running over wild flowers, bending down the grasses and emerging out of holes in walls, out of the bark of fallen timber, in fact, it is so common as to be met with anywhere close to Mother Earth. The female is less than half an inch long, greenish brown in colour, with grey down on the abdomen.

A long tube-like cocoon is built with two separate compartments, one for the use of the male and the other for the female, to be used only during the breeding season. In June, when the eggs are laid, the male spider lives contentedly in his own room, whilst his wife resides in the other. They are exceedingly timid little things if disturbed at any period previous to the arrival of the egg cocoon, but its arrival changes the female from a markedly timid little creature to a very pugilistic and certainly brave mortal, willing to face anything and everything for the protection of her eggs. She is so very fond of her home, that when she dashes out to

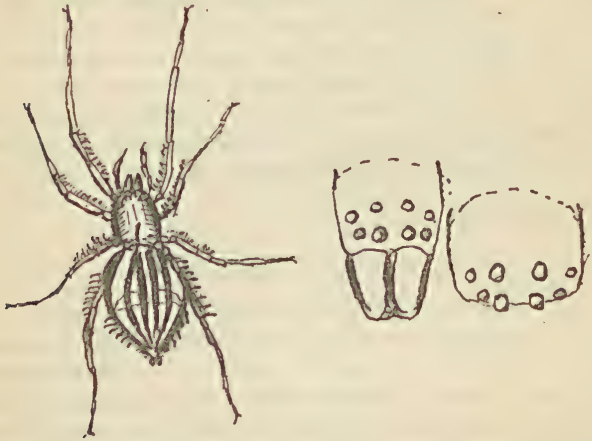
capture an insect she carries her victim back into her abode without wasting a moment, even though the insect by its frantic struggles may do great damage.

Make an attack on the home when eggs are present and Madam Spider rears up furiously, a wild attempt to destroy you or frighten you away, and then, after facing you bravely for a few moments, her courage evaporates all at once and she loses her head, runs to the entrance, leaps out and, without laying a line, drops on to earth below. She lies there as if dead, and then all at once thinks better of it, recovers, hurries away, climbs up to a suitable position and starts with frantic haste to build a new home, weaving new lines, new cross pieces, as if there was no time to lose. The long tube-like cell begins to show itself, and the old home, the treasured eggs, are entirely forgotten.

As a situation she prefers the inviting opening in the bark of a tree or a hole in a wall where the mortar has fallen away, or starts work behind a leaf. The home completed, the spider waits for the coming of a mate, sitting close to the entrance, sending out her signals and passing the time by dashing out now and again to seize any insect which may be passing.

Fond as they are of their own family, these spiders prey on the nests of others, sallying out in search for cocoons and, finding them, bite through the silk and eat the eggs.

A very different creature to the brave C. holoserica is C. accentuata, a little yellow brown spider which lives the life of a pirate during the autumn and builds a home, a long white tube open at both ends containing a single room in the centre, in



CLUBIONA

which she resides during the summer. Startle this spider and she wastes no time in making herself scarce. One wild leap out of her home to the earth below, away she hurries, taking the most marked precautions to hide as she escapes.

A multitude of lines stretched between the stems of plants, a tangled scheme indeed is the home of

C. erratica, and all this, all these lines, crossing and re-crossing in every direction, is to keep away enemies from a little tiny patch of thick web where the cocoon with deep yellow eggs is resting. The poor little mother sits in the nest, satisfied that the numerous "ropes" stretched all around are strong enough to hold back the most powerful enemy!

What must be her surprise and horror when a wasp flies straight through, or a butterfly tears it to pieces, or a cockchafer takes it in its stride. You can imagine the horror as the whole show goes down, as the ropes give, and the enemy comes through!

Drassidæ (Family V.)

Genus 3.—Argyroneta

The male water spider Argyroneta is larger than his spouse, an exception to the general rule of course, for most male spiders are far smaller than their wives.

A jam jar with two or three swimming in it will delight you and keep you amused for many hours. Few things are so interesting and so fascinating. Consider eight black legs, and a black cephalothorax attached to a lump of quicksilver "sailing" round and round in the water, the legs waving in all directions.

At night, when it is warm and the stars light up the heavens, they come to the surface, climb through the film and, running to land, have some terrestrial hunting.

Below the water are thimble-shaped webs of closely woven threads attached to the stems of water weeds by web ropes. As soon as the home is ready, and it takes about forty minutes to build the home, the spider hurries to the surface, and pushing its body well out, withdraws it with great suddenness, a jerk, and swims down at a great pace to the thimble web below. For it so happens that the abdomen, closely covered with hair, collects air, and hence, when under water, appears to be a large air bubble resembling silver.

On reaching its thimble, the little creature seizes hold of the ropes, and pushing its body into the entrance shakes itself so violently and rubs itself so much against the edges that some of the air is liberated and rises in bubbles to be held by the closely woven web. This done, the spider swims up once more for further supplies, and so on until the house is full and below the water a large white bell appears.

When engaged in filling the home the spider, to obtain all the air possible, often uses its hind legs to capture a larger supply. Then with an air bubble held between its legs extended behind the body as it dives, not only is its abdomen surrounded by air, but it also carries with it this extra supply.

This air in the thimble allows the spider to remain down below the surface for considerable periods, but it is very careful not to waste it, preferring to come to the surface and collect air as needed. So

it carries with it its own atmosphere, and by turning over on its back allows the air to move to the breathing pores.

One day Mr. Spider leaves his own home and most carefully and somewhat hurriedly builds a thimble web close to the female spider's house. Needless to add, he is always most particular to be engaged on other business when the object of his affection and admiration comes sailing down to her bubble. He weaves most carefully, and as soon as the house is completed starts to fill it with air. It is amusing to see him on his way down with a supply meet the lady near her home. On this he swims off at a tangent as if he had some other call to make, and takes the air with him.

At last, after many near escapes, his detached home is completed and furnished, and now he builds a tube towards the wall of the house next door, in which, as you know, the lady resides.

The tube, when completed, is also filled with air, and the lover enters this house and, with great fear and obvious hesitation, walks a short distance towards next door and then decides to stop to think before he acts, and this causes him to retrace his steps, hurriedly perhaps.

After several attempts to find sufficient nerve to do the deed, all at once his courage increases, and down the tube he goes, bent on business. He bites a hole into the semi-detached residence! Very often this is the last thing he does in this great

world, for as he enters so his life goes out. It may be a catastrophe for all concerned, for Mr. Spider has no desire to be eaten and came for other purposes, and being larger than the female, makes a wild bid for love and life. There is no room for

ARGYRONETA AQUATICA.

THE WATER SPIDER

fighting in the thimble, and so when the lover and his lady seize each other and fall head over heels and roll to and fro, in the middle of all this excitement the ropes give and up goes the home to the air above.

Should, however, the meeting be a friendly one and the lover on entering be welcomed, peace and

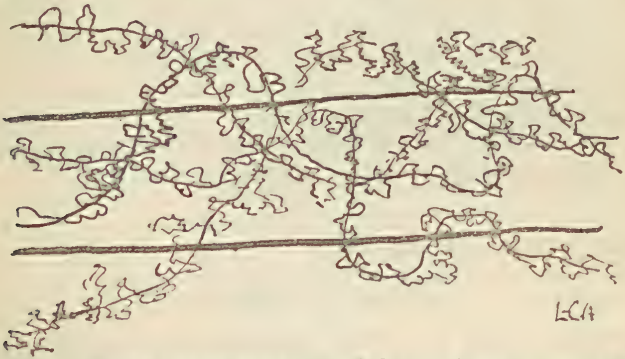
concord reign, and the eggs are laid in a cocoon attached inside the diving bell, where subsequently the youngsters on hatching live happily.

When large enough, these youngsters swim out of the maternal residence each with his or her share of the air inheritance attached to his or her abdomen, entangled in the down. The first moult over, they set out capturing prey, and each weaves a dome for itself, making its own collection of atmosphere. Then as they mature they find their own husbands and wives for better or worse, in the same way as related.

When winter comes the water spiders sleep in a special diving bell, made of very thick web, fastened in the deepest parts in the water. In such warm and airy retreats sheltered from the rain, wind and cold, Mr. and Mrs. Spider and many of the Master and Miss Spiders live happily, each in its own little thimble, waiting for the summer to come again in a veritable village of white bells. Water spiders have funny ideas as to hunting; they attack with foolish audacity all and sundry swimming within reach. Not only are small insects captured, but such large things as water shrimps are attacked. The water spider makes the most furious onslaught, dashing out from behind or below a plant. Coupled with frantic attempts to seize the prey with their front legs is a wild desire to cling on to the plant with the other legs—the result of which you can imagine perhaps without further description.

CINIFLONIDÆ (Family VI.)

This family is divided into three genera; the hair curler spider (Ciniflo), the workman (Ergatis), and the soldier (Veleda), and all have the peculiar double row of curved spines on the leg, known as the cala-



mistrum, used in the making of the curious flocculated webs, common to all this family.

They are also peculiar in having a fourth pair of spinnerets. The webs are the most complicated of any which spiders produce, and the threads are interwoven in such a manner and twisted in such a way that veritable confusion of fine texture results, which runs here and there, twined to and fro on the main lines, which are of the ordinary kind. These twisted web lines are made by brushing or teasing

out, resulting in the down which gives the web its blue colour. If you handle the web it at once sticks to your fingers in the most persistent and annoying manner, for the fine flocculated silk becomes attached to the rough projections on your skin. The blue colour makes the web appear dirty compared with the white and semi-invisible webs of most spiders. Children very frequently are terrified if the web of this spider touches them, for it clings to them with that uncanny persistency already alluded to, and every effort to remove it results in the web catching on elsewhere. The way it clings is certainly enough to startle children, for it appears to have a life of its own, a curious unreal life.

Ciniflonidæ (Family VI.)

Genus 1.—Ciniflo

Ciniflo atrox is a long narrow brown spider, three eighths of an inch long, with a dark mark in the centre of its abdomen and a dark patch of hairs passing along to the spinnerets. Its poison is stronger than that of most spiders, and it seems to know this, for bees, wasps and beetles, and even the dreaded ichneumon flies, should they get into the web, are attacked without hesitation. No sooner has an insect struck the web and become muddled in the fine flocculated silk which clings on to the victim's body, than Ciniflo atrox runs quickly out and is at

the victim. A single bite with her falces is sufficient for any insect, however large it may be, for it is immediately paralyzed, and can no longer move or attempt to defend itself.

In June their cocoons are formed, flat and about a quarter of an inch in diameter, made of pure white silk, very different to the flocculated silk of the trap. The spider, realizing perhaps how noticeable this cocoon must appear, covers her work with particles of soil and small fragments of stone, so that when finished the cocoon is a dirty brown mass, through which it is difficult to see the pale yellow eggs which it contains.

In case of emergency C. atrox, like many other spiders, seeks safety by dropping straight out of her web and feigning death. She does not wait a moment, but at the very first sign drops down from her web without even stopping to attach herself. Poor atrox is so much dead that you can touch her and even push her about, and she exhibits great, unbelievable self-control, for whatever you do she remains "dead."

After a more than usually protracted period of "death," patience is at last exhausted, and every now and again the spider shows how anxious she really is to get up and run away, but then on further thought decides to remain dead after all. Each time the little creature starts coming to life again, she opens out her legs, but thinking better of it, draws them up again.

At last the spider can no longer remain still, and after changing her opinion more than once, wakes up, gets on to her legs, and runs for dear life.

Early autumn the little spider prepares for the colder weather by seeking a hole in a wall just large enough to hold her. Here she most carefully and adeptly weaves around herself a most magnificent coat of flocculated silk, and in this warm overcoat, resembling fine rabbit wool, she rests whilst the cold weather passes by.

The largest of this family is C. similis, over half an inch long, with eyes in two rows across the head, easily seen without a glass. It is a very common house spider and runs all over the place at night. Whilst the female lives in the web or close by it, the male spider, except during the breeding season, lives in a crack in the wall, in the corner of the room or behind such things as wardrobes, which afford the darkness and shelter desired.

C. ferox is larger than atrox and has similar habits, but loves to hide in dark corners, where the flocculated web collects the dirt. The female, when disturbed, instead of feigning death, fights savagely, using her falces with great ferocity. It is so often found in churches behind projecting objects that it is known as "The Churchman" spider.

The legs of all the Ciniflo are either 1, 4, 2, 3, or 1, 2, 4, 3, and are noticeably short when compared with other families.

Ciniflonidæ (Family VI.)

Genus 2.—Ergatis

The Ergatis (a workman) spiders, of which the largest, E. benigna, have legs 1, 2, 4, 3.

Ergatis benigna is a grey-brown creature, with very nearly a white abdomen marked on the top like a set of steps. It is a very common spider, one-sixth of an inch long, the very personification of good nature. The web, which is, of course, flocculated, is frequently woven between the flowering heads of grasses; extremely untidy, so untidy, indeed, that it is hard to believe that there is any plan about it. Though it suggests a hopeless muddle, yet the accumulations of fly remains speaks well for its efficiency. It is by no means merely a mass of threads flocculated and twisted and curled, crossing one another full of dust caught in the fine meshes, but a web of intricate design with futuristic tendencies and concealed values.

In the breeding season suspended amongst the remains of many a feast are the three egg cocoons, white, flat objects. The parents, very much on the alert, love to hide at some corner of the nest, or close to the grass heads and sit there expecting visitors. The male and female build the home together, and sit side by side and share without dispute the day's catches. The good wife has none of those strange tastes which so many ladies of Spiderland possess. If she does not love her

husband, she certainly tolerates him, whilst her attachment to her egg cocoons and subsequently to her young is very real.

Ciniflonidæ (Family VI.)

Genus 3.—Veleda

Lastly there are the Veledas, tiny spiders whose name of soldiers is difficult to explain. They all build most beautiful snares of perfect design. They have longer legs than Ciniflo in order of 1, 4, 2, 3, the first pair being very much longer than the second pair. They are also peculiar in having the calamistra on the fourth pair of legs. The spinnerets have special spinning organs in front of the spinnerets.

Veleda lineata is easily recognized by the brown lines which run lengthwise on the cephalothorax and abdomen, and the extraordinary long front legs. The first two pairs are out of all proportion to the centre legs, the shortest (3). They, like the rest of the Ciniflonidæ, make flocculated webs, building their homes across depressions on the ground, or amongst the stems and the flowers of grasses.

AGELENIDÆ (Family VII.)

This family contains some of the spiders we cannot help but know, for amongst others there is the

CINIFLO SIMILIS ♀

ERGATIS BENIGNA ♀

CINIFLO

ERGATIS.

VELEDA LINEATA ♀

VELEDA

AGELENA LABYRINTHICA.

AGELENA

House Spider, the "roof raiser" (Tegenaria) and Textrix (the Spinster), Agelena (a forager), responsible for the great flat webs. There is also the dark brown spider Cœlotes saxatilis.

The Agelenidæ are one and all great weavers, some live in the house, in farm buildings, and others reside in the fields, but wherever they live they all weave extensive sheet webs, to the misery and despair of blue bottles, house flies and (often) maidservants, who are one and all taken in the snare.

The large sheet is closely woven, and has attached to it a tube, in which the owner of the web spends the fleeting hours. The tube, which is the residential portion, is so closely woven that it is difficult to tear. It contains one or more rooms, in which the egg cocoons are hidden.

Whilst some spiders will not come out of their retreats should you shake their webs, the Agelena hurry out to survey and are most annoyed with you for interfering with their home.

The webs are placed in varied situations, depending on the species, on bushes, between the leaves or twigs, and many of them love the hedgerow, and hang the web amongst the stems of grasses, between the flowering stalks, where in the early morning they add to Nature's jewellery by collecting glistening dewdrops.

Some again weave over horse footings, and during the war, in No-Man's land, a German shell was

connected to a rusted iron-sharpened stake by a huge white web, the property of one of these great web-makers, who did not realize how dangerously foolish the superior creature man can be at times.

Agelenidæ (Family VII.)

GENUS 1.—AGELENA

AGELENA LABYRINTHICA, the spider of the field and hedgerow, has two noticeably long spinnerets, like a couple of tails and long legs. The female has a red-brown shield and brown, hairy abdomen, and is half an inch long. It has also curiously developed palpi, which resemble an extra pair of legs.

The web is usually attached horizontally, and the closely woven residence contains two or more rooms, In July and August, cocoons containing yellow eggs are placed in these compartments and are attached to the sides.

Agelena labyrinthica, the field spider, is, as we have seen, a near relation to the house spider, making huge sheet webs in the hedges. The male and female live together quite happily.

The making of the sheet is the work of about an hour, but various alterations are made and parts are added from time to time, The foundations are very fine lines, at first invisible, stretched between the twigs, lines so thin that you only know they exist because you see the spider walking to and fro, and it cannot walk on air! Gradually the

foundations are finished, and the spider moves up and down over and over again, and just as gradually a sheet comes into being, a sheet which scintillates in the sunlight. More and more hours pass, and the hard-working creature is still at work adding bits here and there. The sheet is white, and might appear to our eyes quite finished, but not so to the spider, for she still is weaving and doing odd jobs. The work finished, the spider sits in the tube contented.

During the breeding season an even more wonderful home is produced, a home of hammocks, fastened one in the other to the sheet. In each hammock other sheets are woven, and finally a layer of soft silk is attached, a cushion on which the spider lays her eggs. Each egg is pushed well into the cushion, so as to prevent it falling. When the eggs are laid, the spider covers them with a layer of broken silk, throwing the liquid silk on to the eggs as one sprays flowers in a garden with a syringe. The silk forms a soft cushion and then around this yet another sheet is woven, a fine silk sheet, under which the eggs are safely stored away; the work is done.

Mr. C. Warburton, in his fascinating book (C.U.S.), which everyone interested in spiders should read, gives an account of the making of these webs, and adds:

"The spider has never seen a cocoon constructed and has no model to work by, and yet it

performs with absolute precision all the stages in their proper succession."

He points out that the spiders do not need light to do their work, but will actually carry it out from first to last in the dark. Mr. Warburton adds that if the eggs are taken away the spider will continue to build and cling on to its home unaware that its treasures have been removed. We can only presume that the spider, knowing full well that it has laid the eggs therein, does not realize that they could be removed, and it is also quite possible that the spider is far too busy to even notice their absence. We know, however, that the eyesight of these web-building spiders is by no means good, and this may probably account for the mother failing to notice the absence of the eggs. We must also ask ourselves what does the silken web look like to the spider, and how would the eggs appear amongst the silk?

It is so extremely difficult to realize the animal's point of view, and I doubt if many who have studied spiders will agree with Mr. Warburton's conclusion on this matter.

These spiders, if you attempt to capture one, are certainly clever at eluding you, for no sooner does your hand approach than the creature is down the tube and out the other end. With the neatness and agility of an acrobat it has a leaf and stem between it and you. Whichever way you think it will go, it as quickly does exactly the opposite,

runs and drops, and vanishes and leaves you. It appears to read your thoughts before new thoughts can change your actions. If you wish to win, seize that back door first, and, holding it, just as quickly face the front door with a box. Though you need a third hand, it is yet possible to get the lid on in time!

A. elegans is a little brown creature with a pair of short, thick spinnerets which stand out like the horns of a Welsh ox. It is a strange little thing, building the web over the footprints of horses and cattle, even over a tenanted rabbit hole. Seemingly aware that such positions are liable to constant and serious interruptions, she does not place her egg cocoons there, but for this purpose chooses a leaf close by, fastening a line from the trap to this nesting site, she also remains on the leaf. It must all seem so strange that, after carefully covering a rabbit hole, the web should vanish, just because, of course, the rabbit takes the air and the web too.

The palpi in the male A. elegans are very broad at the ends, so broad, indeed, that the wee spider appears to wear a pair of gloves.

The male A. brunnea is rather larger than elegans, and has even broader ends to its palpi, reminding one forcibly of the boxing booth. The female in this variety hangs her cocoon from a twig, and covers the cocoon with mud.

Agelenidæ (Family VII.)

GENUS 2.—TEGENARIA

TEGENARIA DOMESTICA is the house spider, the bane of the lazy housemaid's life, for it falls to T. domestica to successfully prove conclusively that the corners in a room have not been recently cleaned. They and Civilis build the unclean-looking webs in the corners which no one ought to see. They are the makers of the masses of accumulated webs which hang year after year like curtains in the coal sheds and amongst the rafters of the farm buildings, turning day into night. They are very strongly-built webs, the thread strengthened by several layers able to bear the weight of accumulated dust, fragments of plaster, mortar, feathers and various oddments. The untidy mess is all the result of endless hard work of that very kindly soul, the good-natured house spider, who make it a rule to carry on ancestral homes until the accumulations of dirt at last drives it to seek another spot, or the main lines give way and the home comes down.

The home consists of two main portions, a tube closely woven, and a flat net fastened at the end of the tube. And here Mrs. and Mr. Spider live in matrimonial bliss, peering out from amongst the dirt and dust at you and me below. It is in the closely woven tube that the egg cocoons, of which there are several, are placed, surrounded by a bag

of fine silk, through which the yellow eggs can be seen. The sack or bag is of a dirty white colour.

The house spiders are constantly experiencing the pleasure of removals, for no sooner does one of the spiders die or leave the area than a home becomes vacant, and a spider of a younger generation, who, in consequence, has a less developed habitat, moves in. His home then is vacant, and then it follows that a spider less fortunate takes over, and so it goes on.

Being a " man of ideas " a spider every now and again makes a few structural alterations, usually additions, and adds a new part to the home, and the female is always thinking of weaving another egg sack and more cocoons, and does it too. Various sheets are needed to shield the home, and it all adds to the general muddle accruing in some corner. Thus the huge tangled skeins which hang across the ceiling or corners, and cluster in huge masses amongst the beams in the farm premises.

T. atrica usually takes up residence in greenhouses, making a web amongst the vines, tying tomato plants together, much to the delight of gardeners. It is said this spider was imported from the tropics and finds our climate somewhat trying. Perhaps this is not surprising.

T. civilis, a very much smaller spider than domestica, and thus not easily confused with the latter, has the reputation of living to as long as four years, and enjoys a long or short life, depending,

more or less, on the energy of maidservants and the eyes of mistresses.

Its cocoons are covered with anything which the spider or natural causes may add to the structure, and as the creature is constantly adding new wings, the accumulation of cobweb is more than even a housewife can be reasonably expected to endure. Can we remain interested in the fortunes of Mr. and Mrs. Civilis, who may live for four years and who sit there in the middle of the most atrocious mess in their second year?

The Agelenidæ are peculiar more or less that they do not undertake aerial adventures, preferring to run rather than fly!

Like all spiders, the first moult takes place when still with the brood. The young spider clings on to the egg cocoon or its coverings with its feet, and struggles until it comes out, a soft, limpid, weak, and miserable thing. It takes about fifteen to twenty-five minutes to dry. The next moult is a different matter, for now the youngsters can weave for themselves. They then attach lines to their backs and also to their legs and hang, trussed up, legs upwards. Their skin splits, and after much wriggling the old skin, with legs complete, remains trussed up, and the spider, soft and wet, dries and hardens.

Before each moult the spider ceases feeding. The moult is a very serious business, for not only can enemies attack with impunity and cannibal relations make the most of the opportunity, but apart from

these risks, it is in itself a very serious operation, and each successive moult becomes increasingly difficult. It takes six, seven, eight or nine moults to make the perfect spider.

The Tegenaria males are the most patient lovers. Arriving at the web, they wait even hours for the lady to ask them in. Every now and again they try and attract her attention by jerking a line in the lady's web. Sometimes five or six males will be on the outer edge all jerking lines. It must be quite confusing!

Agelenidæ (Family VII.)

GENUS III.—CŒLOTES

THE only British variety of this family is saxatilis, a somewhat thick-set brown spider about ½ inch long.

The cephalothorax is red brown and the abdomen rather bee shaped and of a dark brown colour. It is a very strongly built spider, length of legs 1, 3, 4, 2—3 and 2 legs more or less of the same length. On the abdomen, along the centre, there is a very dark pattern and dark spots along the sides.

The male is only slightly smaller than the female.

The cocoons are white snow-like objects, often covered with fragments of earth to make them less conspicuous.

Agelenidæ (Family VII.)

GENUS IV.—TETRIX

THE web placed horizontally in the corner of some building attached to a tube woven into a crack where the mortar has given to allow room is the home of Tetrix lycosina, a most delightful spider, charmingly marked. The legs have dark brown rings (annulation) on them so closely placed as to give the spider a mottled appearance. A broad yellow pattern on the back of the abdomen and a narrow yellow stripe in the centre of the shield of the cephalothorax, adds to the beauty of this variety.

The eyes are placed right at the end of the head, which ends more or less in a blunt point, giving the spider the appearance of staring at some object.

The fourth pair of legs are the longest, second and fourth are about the same length, whilst the third pair is shorter. 1, 2, 4, 3.

THERIDIIDÆ (Family VIII.)

IN the box hedges, should the box hedge be allowed to get out of hand, amongst the leaves are a medley of fine threads which cross and re-cross in every direction. Similar webs are found in buildings, and this confusion of interthreading lines, which may appear to have no system, is yet clearly built

according to plan. Although we may have difficulty in seeing the system, they are all very similar, and it is clear that there is no indiscriminate building about it.

These spiders are also mainly responsible for the carpeting of this earth with spider web streamers. These gossamer days are sometimes so extraordinary that unless one has witnessed this phenomenon, it would be hardly believable. On such days the hedgerows, every stone, every stick, every flower and every piece of grass has streamers attached until the whole earth is just a shining white carpet scintillating and waving in the sun.

There are two genera, one the Pholcus, represented by one species only, P. phalangioides, perhaps the strangest spiders we have; the other genus, the Theridion, a large and powerful one, contains many very common spiders as well as some rare ones. They are all very similar in their methods of web building, all weaving a tangled scheme.

Theridiidæ (Family VIII.)

Genus 1.—Theridion

The Theridion, rather small spiders with comparatively large abdomens, are noted for domestic bliss, and not only have the males no reason to fear their wives, but the children are quite safe with their parents.

In July and August the two old spiders sit side

by side on a leaf with their family all around them. Being spiders of the day and loving to bask in the sun, many of the Theridiidæ are taken by Fossorial wasps, which are most active in the warmer periods.

T. lineatum is a small, light yellow spider, the male about one-seventh of an inch long. It has somewhat long legs, and is often nearly white in colour. It has black lines on its abdomen, and black and white spots which at the end of the abdomen form a horseshoe. It is so common in every garden and such a pretty spider, too, that readers will recognize it easily. The cocoon is fastened tightly to the back of a leaf held in position by a number of lines run in all directions; often several leaves are fastened together to form a tent. The cocoon is of a bluish green colour.

The family lives in this nest for some time after the eggs hatch. It is an extraordinary example of the marked difference between cocoon silk and the ordinary silk used for the snare. It is, as already stated, this cocoon silk which has the most value from a commercial standpoint.

One of the smallest, but unfortunately very rare, spiders in this group carries her cocoon with her, fastened to her spinnerets. All other members of the group attach the egg cocoons to the lower sides of leaves, but poor little T. carolinum is an exception.

T. quadripunctatum, a brown spider with a fat, round abdomen and eyes which are placed in a

somewhat prominent development of the cephalothorax, lives in the walls and forms her web where bricks are defaced. She builds a web of fine thread, crossing and re-crossing in every direction, and when a fly strikes the snare the spider adds greatly to the confusion of her victim by violently shaking her web up and down. The slack lines wave here and there, so that the victim, already terrified and frantic, becomes more frantic still and thus more entrapped. This small spider, only about one-eighth of an inch in length, puts body and soul into the effort.

T. sisyphum builds a white tent-like web in ivy or the leaves of trees, preferring lime trees. The colour of these spiders shows marked differences, varying from blacks to whites, with various shades of yellow. Whilst sisyphum is rare, T. nervosum, the great tent builder, is common. The snare of this spider is just a number of threads running in all directions, raised in the centre to form more or less a roof. Fastened in the middle of the snare or attached behind a leaf, is a little tent of closely-woven web lined with silk, and on the outside of the dwelling are fastened an assortment of strange things, many oddments of plants, fragments of leaves, petals, the husks of seeds, and amongst it all the remains of insects. There one can find the heads, the empty chests of small beetles. It is certainly an original thatch to the home.

Inside this residence the mother spider hangs

TEXTRIX LYCOSINA

THERIDION VARIANS ♀

THERIDION NERVOSUM ♀

F.F.H

TESTRIX LYCOSINA

THERIDION LINEATUM

THERIDION LINEATUM,

head downwards, clinging on to her egg cocoon, an object one-eighth of an inch in diameter, and she covers it with her body, and later, when these eggs hatch, the family reside there, and leave it to mother to dash out from time to time and bring in a victim.

Large numbers of these spiders live together. A bush is often covered with their snares and small tents, just a confusion of traps and homesteads, amongst which are found the parents as well as egg cocoons, and many a youngster in various stages of development, age and sense.

T. riparium, a very small creature, the female one-twelfth of an inch long, is a master builder, the nest consisting of a closely-woven tube, sometimes over two inches long, into which small stones, sticks, grass, flowers and leaves are most carefully sewn. All this is to hide the three or four cocoons. The entrance to this home is at the lower end, and the spider runs down the side to enter.

Each piece of wood or leaf used in the making of the home has been hauled up by means of a spider tackle, for on finding a suitable object for her purpose she attached a line to it and thus dragged it after her, until it lay on the ground beneath the home. Then climbing up to her residence above, she seized the line and, drawing it up, drew the material needed some distance from the ground. This done down she went again to attach another line, and, climbing back, hauled away until the

object fastened to the lines is lifted up against the tent. If successful, a few moments later she has fastened it securely, and is running here and there finding further objects.

She also collects small fragments of earth, makes pellets of clay and attaches these, until her clean, white home is just a dirty, irregular, brown lump surrounded by her snare.

The egg cocoon is one-eighth of an inch in diameter, and as soon as completed she clings to it, full of maternal feelings. But as the mother is only one-twelfth of an inch long, the wee creature clasps an egg cocoon far larger than herself. Pressed close to her, she covers it, as best she can.

That her maternal feelings are real for its contents is proved, perhaps, by her subsequent behaviour, for when the young T. riparium arrive in due course, she spends her time fetching dainties, mainly ants, for which the children have a partiality.

For some weeks the family remain together, and many an episode takes place. As soon as a fly is in the web she hurries out, and with her go the family, as inquisitive and keen to take part and see what there is to be seen, as children are.

The riparium family, when still quite in infancy, go only a short distance along the lines, and stand there, so many little black specks, and wait there until, becoming tired and losing interest, they return with great haste to their nest, and run as fast as is possible, and do not stop until they have

bundled back into the shelter of their home. As they grow older, as all things do, they, too, become more serious, so that a fly in the web means quite an exciting adventure in which they take a more serious interest. So whilst mother hauls the captured fly up on a line, the family spread all round, sit there full of admiration for her great deed, and occasionally run up to have a closer view or to ask, perhaps, whether assistance is desired.

The female is always busy, for no sooner is one family hatched than she is preparing for the next.

T. pallens, a very common spider, is the smallest of the family; the female is only one-sixteenth of an inch long. As the all-important man is much smaller than his lady, it may not be surprising that he has been difficult to locate. The egg cocoon is a pear-shaped object, fastened to the underside of a leaf, and the female spider remains close at hand until her children have passed through their first moult and started homes of their own. Then they go and leave her.

Theridiidæ (Family VIII.)

Genus 2.—Pholcus

The second genus of this family, the Pholcus, is one of the most curious of British spiders. It resembles on first glance a harvestman (but harvestmen are not spiders), for it has great long legs which stand up

well above the creature when the spider moves, so that it appears as if suspended between legs, in a sort of hammock.

Strangely enough, the female carries her eggs fastened together by silk held in her fangs (falces). The fine silk holding the eggs together is really the cocoon, but each egg is also fastened to another by silk. When the eggs hatch, the family also clings on to the falces, so that the spider appears to have a huge swollen round head. In case of danger the brown lump dissipates with a suddenness which startles you, and as soon as all is well again, the family collect together on their mother's falces to form a round brown ball once more. Pholcus is the most energetic web shaker amongst the spiders, for no sooner is a fly entangled than the spider shakes the web up and down with extraordinary energy. Putting all its weight into this effort, she shakes and the web shakes too. She will tremble violently when alarmed if away from her home. A Pholcus spider seeking safety by becoming invisible does this by seizing several lines in its feet and, clinging feet upwards, twists itself round and round so that the cords tighten and on release whirl the spider round at a great speed, so fast indeed that you can see nothing but a grey blot—the spider.

The spider winds up the cords by pushing with her free legs and turning her body. Once the oracle works it becomes automatic perpetual motion, whilst the momentum lasts, for the rush of each

whirling twists up the lines in the opposite direction and gives a whirl again.

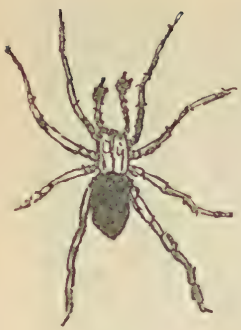
So the spider whirls round for quite a long time until, wishing to stop, it just lowers its legs and puts the break on!

Like all the Theridiidæ spiders, Pholcus builds a most untidy but adequate web, and as soon as a victim is more or less safely taken, sets to, to weave a shroud around it until the victim is entirely encased in silk. This done, the spider goes up and kills its victim.

The weaving of a shroud is work needing great care, for the captive makes mad attempts to escape, and she starts well out of reach of her victim, drawing lines across it and stopping every now and again to shake the web so that the sagging lines become further entangled.

Drops of liquid silk are poured on to the insect from a safe distance, and a line is attached which, by running round and round, completes the shroud, so gradually the fly, unable to struggle, is also unable to defend itself, and the spider, realizing this, now comes closer to weave. At the finish the fly is in a thickly white-woven white coffin, with just its head showing in the opening.

The great thing in the life story of this family is children's day. Let the sun be shining out of a blue sky with just sufficient wind to gently stir the grasses. Such a day is ideal, it is a great day for the children, especially the Theridion youngsters,



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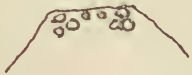


♂

NERIENE BITUBERCULATA

PHOLCUS PHALANGIOIDES.

PACHYGNATHA DEGEERI.

who, so small that they resemble little brown and black specks of dust, wander up on to anything which will give them height. They are just some amongst many little spiders of other groups, all assembled for a similar purpose.

The wind is right. It is a scene of great activity, and the tops of the gates, the hedges and stones are soon crossed and recrossed with numberless short fine silvery lines. Under the lines a large number of minute spiders are running to and fro, creeping up the gate posts, up the branches of the hedges. Some which have reached the cross bars find that this is not high enough, and up they go again. On the top of the gate large numbers of little spiders are raising themselves on their tip toes in the strangest manner, holding on to a silver thread. From out of their spinnerets comes a thin line which gets longer and longer, and is caught by the currents of the air, so that more and more is drawn out until a line of considerable length waves above each spider.

Every now and again the spiders give a jump, leap off their toes, another jump, another failure, and then once more, and leaving go its silk line, sails away in the air, sails higher and higher until it vanishes.

At every suitable spot the same thing is happening. The younger generation are off to seek their fortunes. Hundreds, thousands perhaps, maybe millions, are leaping up and down and sailing away into the sky; some are starting from the top of stones, some off

buildings, some off the flowering stalks of grasses. They are the young spiders leaving the neighbourhood of their homes to face, for better or worse, the world beyond. Some start all right, but the wind alters so that they fall again and land, but these experiences do not dishearten them to try once more.

Although the larger number are probably Theridiidæ, there are spiders of all kinds and families setting out. Many are wolf spiders, many are the young of garden spiders, and whilst most are children, some are too large to be considered children any longer, and are indeed adults who, for reasons best known to themselves, are also flying away. But whatever the breed of spiders, whatever their age or sex, they are off in multitudes to wherever the wind may care to take them.

Very little wind is required, and it is on a calm day with just a breath of air that the spiders go. If there is much wind the spiders wisely put off their journey for another day, for a violent wind not only breaks their sails but handles them roughly.

Later, when the spider decides to land, it merely hauls in its sail, gradually gathering the line in, and so comes down again.

In his "Naturalist's Voyage" Darwin gives an example of the result of a spider movement, for when the ship was sixty miles from the nearest land enormous numbers of spiders appeared and descended as rain on to the decks. This will show the distance that spiders will travel once they are

started, and also shows clearly the risks these little people face when this multitude of atoms of energetic life sail into the sky to face both winds and storms.

When the breeding season has been a successful one, and if the day of sailing has had to be constantly postponed owing to the weather being too rough for the journey, then when at last a suitable day does come and the sky is blue and everything is calm and quiet, with just that gentle breath of air to make the grasses tremble, a huge move takes place.

Then it all comes at once, so that the result is the phenomena, the "scurded draw" of Spenser. Great acres of sky are flocked with little specks of white.

Gilbert White mentions a shower of spiders which covered an area of eight miles, and when he climbed a full 300 feet up, they were still falling from the sky above.

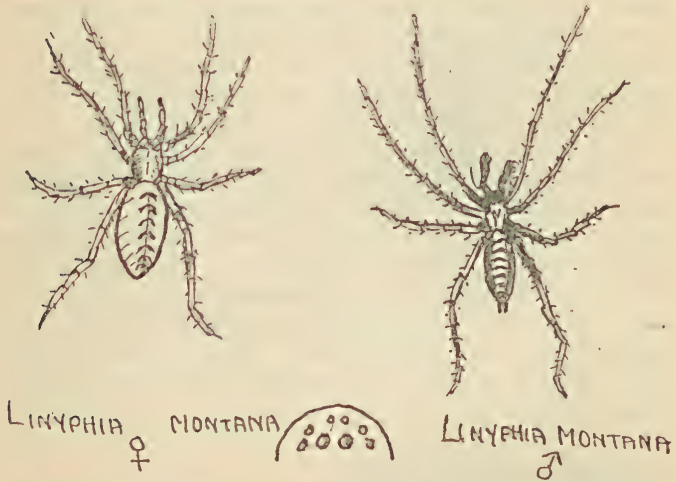
LINYPHIIDÆ (Family IX.)

Genus 1.—Linyphia

The Linyphia genus contains many rather small spiders, including L. montana, the common hammock spider of the hedgerow. The female L. montana has a brown shield, and the abdomen has a dark band marked with a white edge. The web consists of a trap in the form of a sheet, above which lines are drawn to form a long narrow roof. The result

is that flies see the sheet and, having their attention fixed on this object and taking care to keep away from it, strike the fine threads of the snare above, and striking the lines, fall on to the sheet below.

Here the spider is in residence upside down on the underside of the sheet, so that as soon as the fly



falls the spider runs to the spot and drives her fangs through the sheet into the victim. She is very quick and very few flies escape. And even if they rise in time, they strike the roof once more and are driven on to the sheet again.

When the breeding season comes the egg cocoon is concealed under a stone, where the spider takes up

residence, and seldom leaves it, preferring to pick up a somewhat reduced living close by than leave her home.

In this family we find another of the nocturnal spiders, L. cauta, with bristles standing up amongst the eyes and legs 1, 2, 4, 3; and there is also the interesting creature L. triangularis, a spider about one-eighth of an inch long, the female having green legs, which is said to retire in its old age, leaving the harder conditions of fields and gardens to take up residence in the shelter of farm premises.

The female of L. crypticolens, a yellow spider, occasionally found in the cellars in tunnels and also in underground passages, such as caves, carries her egg cocoon fastened to her spinnerets in a similar way to the Lycosidæ (wolf spiders). Unfortunately for L. crypticolens, the egg cocoon is as large as she is, and thus the poor little thing finds it extremely difficult to carry this burden. She is compelled to raise herself on tip toes in order to protect the eggs from injury.

Linyphiidæ (Family IX.)

Genus 2.—Neriëne

The second genus of the Linyphiidæ are the Neriëne, containing a very numerous group of dark coloured spiders, some of which are the most minute of any British species. The males often have strange heads. The length of legs varies in the

sexes, and whilst the females of different species are often so similar to each other to be unrecognizable, the males have the most peculiar cephalothorax, which leaves no doubt as to their identity.

NERIËNE PILOSA.

♀

WALCKENAËRA ACUMINATA.

In the variety N. longipalpis the male, about one-tenth of an inch long, has a toothed shield. It is a curious wee beast; it runs lines from plant to plant, a simple tight rope on which it travels, and occasionally it takes to water, and not only remains below the surface for long periods but is also able to swim.

The male N. cornigera (male legs 4, 1, 2, 3) has horn-like projections on the end of his palpi, whilst N. bituberculata has such extraordinary palpi that he appears to be wearing mittens. His yellow cephalothorax and black abdomen give him an appearance very much of his own.

Linyphiidæ (Family IX.)

Genus 3.—Walckenæra

The Walckenæra, closely related to the Neriëne, the females of which are often indistinguishable from that genus, are a large group of very minute spiders, some of which have the most astonishingly developed heads. Of these the male W. acuminata is perhaps the most surprising.

In this family we get the eyes in the males carried well above the head on a projection, sometimes elongated to form a tower. The advantage of this peculiarity is not known, but it certainly gives the spider the opportunity of keeping himself hidden and yet seeing over the obstacles in his way. In size the genus varies from the largest, only one-sixth of an inch in size, to the smallest, a tiny spider under one-twentieth of an inch long. In every variety the male head is very much more developed than the head of the female.

W. acuminata has on the head a growth like a fine hair swelling out at the middle and top (see

Frontispiece), and on both these enlarged portions the eyes are borne.

W. aggeris, a spider one-sixteenth of an inch long, has a head resembling the hats that horses wore during the "keep the sun out of their eyes" period, and the head of the rare spider, the male W. unicornis, has a Y-like growth in the centre of his head.

W. frontata, a common spider, goes one better, for whilst the female has an ordinary head, the male of this species has a long, narrow cephalothorax, which rises in front and ends in a knot, and on this knot a tuft of hair appears, and with two eyes facing the front. Then another pair of eyes are placed on the shoulders of this curious head-piece, and a further pair are arranged close together. Then the last pair of eyes are situated on the neck of the knob and so actually face towards the back (see Frontispiece).

What this spider must see, presuming that all eyes are in use at the same time, is difficult to imagine, for it must see in a complete circle all around it, in front, to the sides, and even over its back, all at one and the same time!

Does it add to its pleasures to be able to see what is happening in front, behind, and to the left and right of it all at once? W. frontata, however, when not running along the top of rails and gates, situations which it delights in, spends much of its time floating about in the air, preferring sailing to walking. Nature might well have arranged for one

eye to be placed on its "underbeneath." Nature, however, gave it a complete circular view on a horizontal plane.

Linyphiidæ (Family IX.)

Genus 4.—Pachygnatha

This last genus of the Linyphiidæ is the Pachygnatha, a genus with huge falces. They are beautiful little spiders, marked with silvery lines. They resemble in habits the Theridion spiders, being aeronautic and also making traps of a somewhat similar kind.

They are found amongst fallen leaves, in low-growing plants, in moss, and seem to prefer damp places, and the concealment afforded by stones, sticks and the accumulation of rubbish which collects in damp situations. Their leg length is 1, 2, 4, 3; 2 and 3 being very much shorter than 1 and 4, shows that they are not Theridions, which have a leg length of 1, 4, 2, 3.

P. degeerii, a black and yellow spider, about one-seventh of an inch long, is very frequently met with. The male has most curious palpi, as if the creature was carrying a disc in each hand. Viewed with a lens, the male spider shows charming markings in silver and gold, varying to red. The female spider has no "discs" of course, and is less clearly marked.

EPËIRIDÆ (Family X.)

This group, which has been more studied than any others, are famous for the making of their webs, webs of more or less accurate geometrical design. It is indeed the webs of these Epëiridæ which are copied by the artists, and praised by the poets. In every case the web is built on threads radiating from a centre, and each radiating bar is crossed by lines, many of which are covered with a sticky solution.

Even the very youngest spiders of this variety carry out the complicated design without appearing to have any difficulty in the solution of the various problems which building this web must mean, and these spiders are able to build the web without mistakes in the design or its geometrical accuracy, even when cut off from all light.

Hidden in a retreat built of very strong and closely woven web, the spider lives with a line from the centre of the web to this retreat. It is along this line that the spider enters and leaves her web.

Many of the Epëiridæ are often seen head downwards, clinging on their webs, and will remain quite still at one spot for many hours, even though the web may be jerked violently by the wind. Although the closely woven retreat is handy, the spider does

not seem to mind, preferring to remain where it is, however hard it may blow. It is a very different matter if anyone interferes with it, for then, after carefully examining the cause of the trouble, the spider runs quickly away or drops suddenly down to earth below.

As soon as it is light, the Epëiridæ spiders brush their backs and wash their legs, passing each leg through the handle end of their falces. This done, they set to to clean their webs, pushing out things which ought not to be there, and repairing damage. They eat up scraps of web. The dew is good drinking water, and some of it is also used for cleaning.

Spiders cannot live very long without water, and dry seasons cause heavy losses.

Some of these spiders build their webs horizontally, others again place the web more or less perpendicularly, and others may prefer to fasten the web at an angle.

The Epëiridæ are "badly" shaped spiders, the abdomen so large and so developed as to give the spider a hunchbacked appearance. In some the body is very round. In one, angulata, the body has curious formations, giving an impression of having been crushed and damaged. Markings of various kinds, white and black spots are numerous, and the garden spider is known as the Croix de St. Denis, for the white spots take up the form of a cross. Their legs are somewhat thick and strong, the feet

have three and occasionally more claws, and in this family we find a special instrument which acts as a thumb, and with which the thread is held.

Epëiridæ (Family X.)

Genus 1.—Epëira

The garden spider is so very common that we all know it, and most of us have witnessed the scene when the spider energetically twirls a victim round, twisting it round and round, so that the unfortunate insect is tied more and more securely in thread. And whilst it entangles its prey, all the time the spider is lifting its hind legs up and down and gradually weaving round the victim a shroud. When the work is finished the insect is enveloped in a thick webbing, and there it remains, unable to move. It is usually large bluebottles which are thus encased, for small flies need no shroud, and they are fixed by the sticky, viscid matter which hangs like numerous beads along the spiral lines.

The making of this web is a work of great skill and patience. The spider commences by allowing a line to leave her spinneret and go just anywhere, and then when this line, which has been drawn out by the wind, catches, the spider satisfies herself that it has caught, and then attaches her end to a suitable object. Cautiously testing its strength and

finding it suitable, she runs along it to the other end, weaving as she runs a strengthening line to the support. And now the spider drops and fastens another line from the first line to some object below, and then climbs up again to fasten another line, and drops once more.

So gradually a framework comes into being, on which the web will be stretched. There are two main horizontal lines, one below the other, joined up by foundation thread. Climbing up, she carefully decides as to the centre, and from this centre the rest of the web is to be made. It is not left to chance, or the web would frequently lack its geometrical design, and the spider's behaviour also shows the care and thought which web-making needs.

Having found the centre, she now draws out her first radius, and fastens it to the upper line. Then back she goes again to the centre and up once more, and running along the proper line to the proper spot she attaches the second radius and then goes back. So the spider continues until the radii are completed. Now commences the web itself, for the radii are merely the supports of the trap, the trap being the spiral lines.

The spider now attaches her line a short distance from the centre, and then runs across the radii from one to another, attaching the spiral line at each stop, and going right round. And this she does over and over again, each time starting at

her distance above the last line. Later, as the space between the radii increases, she has to jump across the space, and then when jumping is out of the question, goes across the narrow places and runs up again to continue her radii in line. The threads used for the spiral lines are covered with a sticky material which gradually forms into tiny beads along the thread. They remain viscid for some considerable time, but gradually dry and become smaller. The spiral thread near the centre of the web is not covered with this sticky material, hence the spider can use the part round the centre without danger.

When the web is finally completed, the spider bites away the centre, and this gives the web great elasticity. As the viscid material loses its powers by drying up, the spider eats the lines and lays fresh ones. Constant repairs are needed.

Epëira diadema builds five or six cocoons, each containing some hundreds of eggs.

Most of the Epëira build webs perfectly designed, but E. umbratica, the curious and somewhat replusive black spider which appears as if crushed, and frequents brick walls, decaying trees, and hiding away in crevices, and so often found in dark cellars, makes a web very different to the majority of this group.

It is a very large web with large square meshes, and appears built without the care and thought usual in this genus, but whilst it cannot compare

in geometrical accuracy with the webs of most of the Epëiridæ, it is yet made on a definite plan, varying in detail.

Because of its appearance in cellars and other dark places, this spider is supposed to shun the light and be of evil tendencies, a very foolish supposition.

A very beautiful but rather rare spider is E. scalaris, a yellow creature with two black spots behind the base on the abdomen; it varies greatly in size, and different sizes are often mistaken for diverse species.

E. apoclisa, a brown spider, makes her web perpendicularly, fastened between twigs. In a dome-shaped cell the male and female spiders live quite happily, and it is here too that the eggs are laid in round yellow cocoons. In the winter these spiders cover the nest with dead leaves, in order, no doubt, to conceal it better, and then, weaving a silk curtain across the entrance, they curl up inside to sleep until the summer comes again.

The large globular-shaped Epëira with the large white spots on a green coloured abdomen is E. quadrata. It lives in a large white closely-woven cell amongst the bushes.

E. calophylla, legs 1, 2, 4, 3, all rather long, has a web distinctly original, for it is a complete web, as all self-respecting Epëiridæ should make, but on one side a narrow section is entirely missing, and instead appears a line by which the spider enters

and leaves her web on her way to and from the silk tubular chamber which is her residence.

E. fusca, found in dark places, especially in damp situations, and feigning death when disturbed, builds a somewhat unique egg cocoon. In shape it is very like the egg cocoon of Hydrous piceus, the water beetle, but is, of course, much smaller. It has a stalk, and in the pear-shaped case are the pink-coloured eggs.

E. inclinata has eyes on small tubercles, somewhat close together, and always makes her web at an inclined angle—hence the name. Trees and shrubs are favourite positions. It is a curious little spider with exceedingly long front legs, the two pairs often being held before its body. When disturbed, the spider at once drops gently to earth, and a few moments later climbs up a thread back to the web. For as it dropped, it had just as quickly let out a life line.

E. conica has a hump in the middle of the body as if it had been injured. Ugly though it may be, E. conica is a past master in the art of building a snare and hiding away in some sheltered spot; it weaves a perpendicular web with two of the radii covered with flocculated silk. It chooses box hedges, close-growing shrubs. The flocculated "roadway" assists in some way or other in the capture of prey, perhaps appealing to the curiosity of passing insects who, settling, never break away again. The male and female spiders each have

a web, and although they may reside close to each other, and appear to be on the best of terms, they are seldom seen on the same web. Occasionally the male and female webs are semi-detached!

We cannot leave these Epëiridæ without mentioning one of the most charming and interesting sights of any in Spiderland. In the late summer, dangling in the air below a branch is a small brown lump, about the size of a cherry stone. As you walk towards this stone to examine why it hangs there, even before you are near it, all at once, to your surprise, it has vanished! The little lump is no cherry stone after all, but happens to be a host, some hundreds of young garden spiders clinging tightly together. They disappeared because you happened to touch one of the countless lines which radiated from them in all directions to the trees and bushes in the neighbourhood. This warned them, so that they dispersed, that is all.

If you stand quite still you will see the cherry stone slowly reforming bit by bit as the young spiders come running along their lines back to the spot and collect there. Great excitement follows, they stow away their small legs, and so gradually the cherry stone becomes larger and larger, at one moment even larger than ever it was, and then gradually contracts again, as the family work their way together.

The baby Epëiridæ remain like this for seven or eight days, and whilst hanging in a ball are unable

to feed, which may be fortunate. As soon as they are old enough, each spider makes a small home for itself, both males and females building webs.

In a garden on the Somme, amidst all the signs of war, where nothing remained but the trees and heaps of bricks, I came across one of these cherry-stone formations, swinging happily and peacefully in the sun, and above came the drone of planes and in the distance the low wailing of projectiles.

Epëiridæ (Family X.)

GENUS 2.—TETRAGNATHA

THE "four-jawed spiders" have very developed falces, with long fangs and tooth-like projections on the fang case. The teeth of the male are much more developed than those of the female. It is an interesting spider, because it is so different to the ordinary.

Its body is so long and narrow, that it has a very fragile appearance, more like a pond skater than a spider, and its very long first pair of legs, which are carried, when resting, well on front of its head, has given it the good name of T. extensa. The third pair of legs are exceedingly short, and the fourth pair comparatively long, and the last pair, when resting, are carried, as far as the spider can arrange it, straight behind it.

It lives by the side of ponds and streams, and its web is placed any way, sometimes horizontally, other times at an angle, and often perpendicularly,

and it rests on the plants, drawing itself out to full length, with its long front and rear legs so evenly placed and so arranged, that it appears to be just part of the plant on which it rests.

There are many stories told of this spider; some consider it a weather prophet, tearing its web when rain is coming; others that when the web is attached above water, the spider removes its web to a safer spot on the approach of wet weather.

When out to win a lady, the male spiders make the most frantic efforts to gain approval and, turning their abdomens from side to side, they sit on the outer edge of her ladyship's residence, hoping to be noticed and welcomed.

The male is about half the size of the lady and paler in colour, and lacks the distinct markings which in the former are so characteristic.

Various sizes and colours of T. extensa are met with. The length of legs, the way they are carried, its narrow and elongated body, make it a spider easily recognized and not easily confused, whatever may be the size or the colour of the individual.

SIX-EYED SPIDERS.—SENOCULINA.

DYSDERIDÆ (Family I.)

A FAR less numerous group are the six-eyed spiders. They are divided into two families, the Dysderidæ and the Scytodidæ. The Dysderidæ are plain coloured, rather small spiders of narrow form, whilst

the Scytodidæ are clearly marked and of noticeable colours.

Whilst the Dysderidæ form tubular nests, the Scytodidæ have a somewhat indifferent web and do not make a tubular home. Both genera have six spinnerets. They are some of the largest spiders we have; great hunters, seeking hiding spots beneath stones or concealing themselves in holes and crevices in walls and rocks. In such places they wait ready for any unfortunate victim which may come within reach.

Dysderidæ (Family I.)

Genus 1.—Dysdera (Difficult combat)

The three British varieties, Erythrina, Rubicunda, and Hombergii, are nocturnal spiders, all somewhat similar in shape, with long, egg-shaped bodies, and a cephalothorax which neatly carries on the general conformation. Their cephalothorax is dark red, and their legs are orange yellow, whilst the abdomen, which is practically hairless, is of a yellow-grey colour. Their eyes are in the form of a horseshoe, the apex pointing backwards. Erythrina is one of the largest of this family, about half an inch long, whilst Hombergii is the smallest, and its eyes form more or less a complete circle.

Erythrina has a great partiality for ants, and at night will sally out to ant heaps and search for victims. The nest of this spider, a long silken tube,

will often be found attached to or placed close by an ant hill, an excellent idea, for it saves time and trouble. So densely is the home woven, that the spider rests in peace during the day and the ants, annoyed as they are, are unable to sting through the web and seldom try the front door, for there is a nasty-looking set of eyes inside that door.

DYSDERA HOMBERGII

The male Rubicunda has extraordinarily developed pedipalpi, resembling the flags carried on lances when they hang at an angle to the lance.

Rubicunda is not so well shaped as the other varieties, its pedipalpi at once (if a male) show its species. Its abdomen is of a blue colour, and the legs and cephalothorax are brown. Its habits are very similar to that of its relatives, for it, too, captures prey and is quite happy to clean up the debris of the feasts which other creatures have left.

Dysdera Hombergii has no scruples, will attack anything which comes near to its home, including other spiders, even its relatives. It is easily distinguished from Erythrina by its size, for it is a

small creature with a total length about equal to the abdomen of its relative. Whilst the abdomen of Hombergii is brown, the legs are black and brown, and the cephalothorax is black and smooth.

The cell of Hombergii is often covered with sand and small particles of soil, and in this nest during the summer about thirty pink eggs are laid. Like most spiders, the children soon find for themselves, and in July and August large numbers of young Dysderæ of these three varieties are searching for homes of their own, sallying out at night and weaving their nests under and in convenient shelters.

Dysderidæ (Family I.)

Genus 2.—Segestria

The Segestria, the second genus of the Dysderidæ, are termed the mat spiders, because their cocoons are made of closely-woven silk and are flat and look so dirty (on account of the fragments of soil which have been laid and worked into the meshes) that mat or door mat describes them only too well.

The two British varieties, S. perfida and S. senoculata, are very like each other in appearances, except that the former is a large spider, the female being about three-quarters of an inch long, whilst the latter is a smaller spider, similar in shape and colour. Both are red-black creatures, grey bodied, with a black mark down the body; in S. perfida the mark resembles a colony of cup

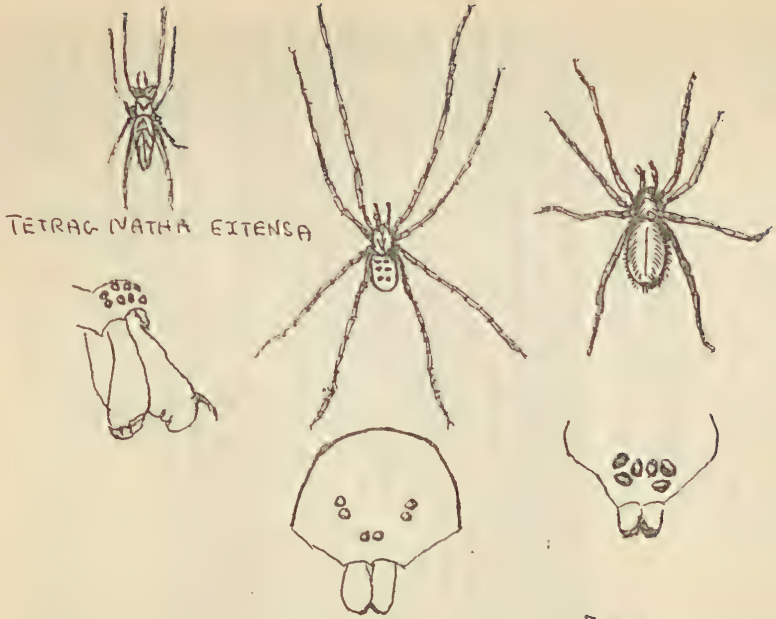
animals one upon another. In Senoculata the black mark is more regular, and Pickard-Cambridge describes them as being like the markings of an adder. In both varieties the falces are a bright green, which appears in contrast to the cephalothorax. The legs of the male are 1, 3, 2, 4, and of the female 1, 2, 4, 3.

Segestria has been found in amber.

Dysderidæ (Family I.)

GENUS 3.—OONOPS

WITH its six eyes like so many black currant lozenges, two in the centre side by side, the other four, two on each side, with a huge cephalothorax and most diminutive falces, such is the tiny spider Oonops pulcher, about one-thirteenth of an inch long. The first thing you notice, perhaps, is that its legs are nearly equal in length; their order, on further examination, is 4, 1, 2, 3. On the underside of the legs are curious, short thick hairs, which the spider elevates and depresses at will. Its abdomen is red, and the cephalothorax is yellow, and the abdomen goes over the cephalothorax, giving the spider a slightly hunched appearance. In May and early June the small white cocoons, each containing two pink eggs, will be found in holes in walls and under the bark of trees. The babies are not so dark as their parents, and have brown markings on their sides.


TETRAGNATHA EXTENSA
E.F.H.
SCYTODES THORACICA
DONAPS PULCHER ♀

Like the rest of this family, Oonops, small as it is, hunts its prey, hiding under stones or in crevices, and making its sorties from its shelter. It is a very active person indeed.

SCYTODIDÆ (Family II.)

Genus 1.—Scytodes

Although this spider is placed close to the Dysdera, because of its eyes, its shape and character make it a closer relation to the Pholcus spiders, with which it can easily be confused. But whilst the legs of Pholcus are 1, 2, 4, 3, those of this curious and somewhat similar spider are 4, 1, 2, 3, that is to say, the shortest legs are first, then the very longest legs.

Scytodes thoracica, the only species, is very rare and seldom met with, and for a considerable time it was doubtful whether this variety existed at all. That it is, indeed, related to the Pholcus is more or less proved by the fact that many of the Pholcus spiders to be found overseas have six eyes, whilst the British variety has eight.

Scytodes thoracica also carries her eggs in her falces close to her chest. It lives in cracks in walls, choosing the sunny side, and emerges from its retreat only on hot days. Then with great deliberation it lifts its long legs one at a time, as if it was extremely painful to move at all. So it walks along the wall, gradually drawing out its web, a thin

sheet, around which at various heights lines are drawn. The eyes of this spider are placed in three small groups of two in each group. In colour it is yellow-brown, with clear black markings. The long thin legs are yellow-brown, too, and have the annular marks which some varieties are noted for well marked. These rings on the legs are nearly black in colour and contrast very clearly with the lighter colour.

In this spider the median fovea is not noticeable; it is the place where muscles are attached and is often very prominently marked. See illustration on page 37.

CONCLUSION

Spiders are easily studied, and are well worth the time and trouble. There is no need to kill them; they make indifferent specimens, and life is too easily destroyed and cannot be re-made by the destroyer.

If properly fed, spiders live in captivity quite happily.

Spider history is still an only partially opened book, with a host of interesting pages waiting study. Why not open it too?

A FEW NOTES

Spiders' eggs.—Usually pale yellow, sometimes white or pink and occasionally brown.

Size of eggs vary from $\frac{1}{16}$ of an inch to $\frac{5}{6}$ of an inch, usually between $\frac{1}{10}$ of an inch and $\frac{3}{5}$. If you collect a nest, reconstruct similar conditions in your box.

Keeping spiders.—Small boxes covered with clear glass, old cleaned photograph plates most suitable. Supply with water and feed on insects or small fragments of fresh meat. Two boxes fastened together communicating facilitates feeding operations.

On some of the illustrations two curious marks will be seen, one a circle above and attached to a cross (Venus' looking glass), the other an arrow attached to a circle, Mercury.

The Venus' looking glass means that the spider indicated is a female; the other mark, Mercury, signifies male.

INDEX

Abdomen, 28, 34.
Active persons, 136.
Aeronautics, 52.
Agelena, 95.
Agelenidæ, 92.
A. brunnea, 98
A. elegans, 98.
Airman, 10, 70.
American spiders, 14.
Anatomy, 28.
Ants, 67, 68, 78, 133.
Arachnida, 14, 36.
Araneidæ, 36.
Argyroneta, 75, 82.
A. aquatica, 75.
Atypus, 9, 38.

Baby spiders, 18, 56.
Birds, 8.
Blackwell, 14, 57.
Bon, M., 15.
Bravery, spider's, 26.
Breathing apparatus, 34.
Bus ; a spider, 44, 49.

Calamistrum, 87.
Cambridge Pickard, 14, 57, 135.
Cats ; in treatment of prey, 24.
Cephalothorax, 28, 32, 82.
Cherry stone of youngsters, 129.
Chest, 28.
Children, 41, 109, 86.
Children's day, 112.
Churchman, the, 90.
Ciniflo, 87.
Ciniflonidæ, 87, 32
C. atrox, 88, 89.
C. ferox, 90.
C. similis, 90.
Civilization, spiders', 9.
Civilus, 99.
Claws, 32.
Clay, use of, 109.
Clubiona, 79.
C. accentuata, 81.
C. erratica, 82.
C. holosericea, 79.
Cocoons, 36, 67, 71, 73, 76, 78, 89, 101, 105, 111, 127.
Cocoons, birds removing, 9.
Cœlotes saxatilis, 94, 102.
Comb, 32.
Complete circular view, 122.
Crab spiders, 68.
Croix de St. Denis, 124.
Cures, spider, 17.

Dancing spider, 22, 66.
Darwin, 115.
Dead, 69, 89.
Death feigning, 24.
Digestive tract, 34.
Diving bells, 86.
Dolomedes, 53.
D. fimbriatus, 54.
Dorset, spiders of, 14
Drama, 45.
Drassidæ, 75.
Drassus, 75.
D. lapidicolens, 77
D. nitens, 78.
D. sericeus, 77.
Drinking water, 124
Duel, a spider, 73.

Eggs, 36, 80.
Epëira, 125.
Epëiridæ, 123.
E. apoclisa, 127.
E. calophylla, 128.
E. conica, 129.
E. diadema, 127.
E. fusca, 128.
E. inclinata, 129.
E. quadrata, 128.
E. umbratica, 127.
Eresus, 58, 61.
Ergatus, 87, 91.
Eyes, 29, 38.
Eyesight, 20.
Expression, 21.

Falces, 29, 89, 111.
Family life, 109.
Fangs, 28.
Field spider, the, 95
Fights, 25, 72, 44.
Floating in air, 121.
Flowers, as hiding places, 69
Fossil spiders, 13
Fossorial wasps, 11, 105.

Geological times, 13.
Gills, 34.
Gloves, spider silk, 15.
Gossamer, 104.

Harvest man, 14.
Haulage, 108.
Head, 28.
Heavy rains, the effect of, 9.
Hecaerge, the, 57.
History of spiders, 16.
Hombergii, 133.
Homes, 79, 83, 96, 108.
House spiders, 94.
Housing question, 15.
Hunting scenes, 62, 86.
Husbands, 72, 92.
Hydrous piceus, 129.

Ichneumon flies, 8.
Italy, 17.

James, Dr., 16.

Ladies, 18, 66.
Ladies' bowers, 24
Large square meshes, 127.
Legs, 30, 118.
Lens, 36.

Life, 36.
Life line, 63.
Linyphidæ, 116.
L. crypticolens, 118.
L. montana, 116.
L. triangularis, 118.
Liquid silk, its uses, 112.
Longevity, 25.
Looking glass and the angry male, 25.
Love making, 18, 40, 64, 84.
Lycosidæ, 42.
L. agretica, 50.
L. allodroma, 50.
L. andrenivora, 50, 51.
L. cambrica, 50.
L. exigua, 50, 53.
L. fluviatilis, 50.
L. herbigrada, 50.
L. lugubris, 50, 51.
L. obscura, 50, 51.
L. picta, 48, 50.
L. piratica, 50, 52, 53, 54.
L. rapax, 50, 51.
L. saccata, 50.

McCook, 14, 46.
Man of ideas, 100.
Maternity, 45.
Miribilis, 55.
Mittens, 120.
Moult, 25, 36, 111.
Mouth, 25.
Music, sensitive to, 18.
Mygalidæ, 38.

Neriëne, 118.
N. bituberculata, 120
N. cornigera, 120.
N. longipalpis, 119.
Nest ; life in, 9.
No man's land, 94.
North, 5.

Octonoculina, 36.
Oonops, 136.
Ovid, 16.

Pachygnatha, 122.
Paturon, 29.
Pedipalpi, 30.
Peckhams, the, 20, 22.
Philodromus, 70, 72.
P. cœspiticolis, 72.
Pholcus, 104, 110; 111, 138.
Pliny, 17.
Poison, 17, 20.
Poison fangs, 19.

Rabbit wool, 90.
Reaumur, 15.
Red Indians, 62.
Re-making webs, 127.
Ropes, 82.
Rubicunda, 133.

Salticus, 58.
S. cupreus, 67.
S. formicarius, 67.
Scaliger, 17.
Scorpions, 14.
Scytodidæ, 138.
Seeking fortunes, 114.
Seeking invisibility, 111.
Segestria, 135.

S. senoculata, 135.
S. perfida, 135.
Senoculina, 132, 136.
Silk, 15, 27.
Six-eyed spiders, 132.
Soldier spiders, 92.
Somme, 130.
Sparassus, 70.
Spencer, 116.
Sphasus, 57.
Spider science, 14.
Spider study, 140.
Spinimana, 57.
Spinnerets, 24.
Spinster, 94.
Spools, 76.
Stomach, 35.
Stowing away legs, 130.
Surgery in spiderland, 25.
Symbol of evil, 7.

Tarantula, 17.
Tegenaria, 94, 99, 102.
T. atrica, 100.
T. civilis, 100.
Tents, 106.
Tetragnatha, 131.
Textile purposes, 15.
Textrix, 94, 103.
Theridiidæ, 103, 115, 122.
T. carolinum, 105.
T. lineatum, 105.
T. nervosum, 106.
T. pallens, 110.
T. quadripunctatum, 105.
T. riparium, 108.
T. sisyphum, 106.
Thomisus, 70.
T. citreus, 71.
T. cristatus, 70.
T. erraticus, 71.
T. luctuosus, 71.
Trap door spider, 14.

Vast dangers, 8.
Veleda, 87, 92.
Vendetta, 9.
Vibration, spiders sensitive to, 48.
Victory, the result of, 45.

Walckenæra, 120.
W. acuminata, 120.
W. aggeris, 120.
W. frontata, 121.
W. unicornis, 121.
Warburton, 47, 96.
Washing, 124.
Water beetle, 52.
Water spiders, 24.
Weather glass, spider, 17.
Weather prophet, 131.
Web making, 18, 36, 95, 99.
Wives, spider, 18, 24, 91.
Wolf spiders, 42, 118.
World of spiders, 7.

Zebra spider, the, 58, 60, 61, 67.

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